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CLINICAL VERSUS ACTUARIAL PREDICTION OF COLLEGE ACHIEVEMENT
AND LEADERSHIP ACTIVITY.

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THIS STUDY COMPARED COUNSELOR PREDICTIONS OF COLLEGE
ACHIEVEMENT AND LEADERSHIP PARTICIPATION IN EXTRACURRICULAR
ACTIVITIES IN A GROUP OF UNDERGRADUATE COLLEGE STUDENTS.
COMPARISONS WERE MADE BETWEEN 3 GROUPS OF COUNSELORS AND ONE
GROUP OF NON-COUNSELORS TO IDENTIFY CHARACTERISTICS OF GOOD
CLINICAL PREDICTORS AND TO COMPARE EFFICIENCY OF CLINICAL AND
ACTUARIAL METHODS OF PREDICTION MAKING. CRITERION DATA
INCLUDED FRESHMAN GRADES, 4-YEAR GRADE AVERAGE, MAJOR FIELD
OF STUDY, GRADUATION VERSUS NONGRADUATION, AND RECORDS OF
PARTICIPATION IN STUDENT ORGANIZATIONS. RESULTS ARE
DELINEATED UNDER THE SUBHEADS OF (1) ACADEMIC ACHIEVEMENT
PREDICTIONS, (2) MAJOR PREDICTIONS, AND (3) LEADERSHIP
ACTIVITY PREDICTIONS. (LP)

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OF COLLEGE ACHIEVEMENT AND
LEADERSHIP ACTIVITY

Cooperative Research Project No. 2202

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Chapter I

INTRODUCTION

Problem on Which Research was Focused

The current national concern for the conservation and development of the nation's talented youth has fostered an increasing demand for professional assistance in helping young people make wise educational and vocational decisions. Most of the responsibility for providing assistance with this kind of planning has been given to the rapidly increasing numbers of high school and college counselors. Training programs for counselors are rapidly expanding to meet this need, but research is badly needed dealing with the counseling processes involved.

Counselors in educational settings often make predictions about the students with whom they counsel. In counseling with students in the process of making educational and vocational plans, counselors are often called upon to help students make such decisions as the appropriateness of college level training, the choice of a college, and the area of study in which a student should or should not concentrate. Counseling of this type has an explicit reference to the future. While not all counseling has such a direct orientation toward the future, almost all educational and vocational counseling has at least an implicit association with the future.

Tests of many kinds have been developed and refined in an attempt to increase the accuracy of predictions, thereby making counseling more effective. Still, the counselor is required to interpret the results of tests for individual students and prediction-making often relies to a considerable extent upon the skills of the counselor himself. Therefore, the

use of test information in the making of educational and vocational plans almost automatically implies that some level of prediction-making is involved.

Most studies of predictive efficiency have been concerned specifically with the prediction of scholastic success, usually defined in terms of first-quarter or first-semester grade-point average. Many studies have been conducted where statistical techniques such as multiple regression have been used to forecast academic success; and a few studies have compared such statistical predictions with counselor or "clinical" predictions. Every adequately designed and conducted study reported to date has found that statistical predictions are at least equal and in most cases superior to predictions made by clinical judges. Counselors often claim, however, that their predictions are superior because they are in the advantageous position of having not only the test results but also know considerable relevant information about students not included in a regression equation. Although this is an area where much research is needed, it is very probable that counselors do not predict with nearly the efficiency that they would like to believe. The evidence collected thus far seems to clearly point in this direction. This likely is true not only for predictions of academic achievement but also for other kinds of predictions that some counselors find themselves making almost daily. In order for counseling to become more effective, it will be necessary to determine through research just how efficient counselors are at making various types of predictions; and to determine which procedures provide the most valid and efficient information to students in the process of making decisions.

Major Objectives of the Investigation

The major objectives were:

1. To compare the predictive efficiency of three groups of counselors who regularly work in different educational settings and a fourth group composed of non-counselors on the following predictions:
 - a. freshman year and over-all college grades,
 - b. whether students would remain in the major programs they selected at the time of admission to college,
 - c. students' participation in campus leadership activity.
2. To compare the predictive efficiency of the three counselor groups and the individual counselors with actuarial predictions of first-year grades and overall grades earned in college; and to compare the predictions of individual counselors with predictions made by non-counselors and with the base rates.
3. To investigate the relationships between the predictive efficiency of individual counselors in making the achievement, major, and leadership predictions and the following factors:
 - a. amount of counseling experience,
 - b. counselors' degree of confidence in predictions,
 - c. counselors' self-ratings of general counseling effectiveness,
 - d. counselor consistency in the use of available case information in arriving at predictions.
4. To investigate the relationship between counselors' predictive accuracy and the estimations of weights that they typically place upon case information in arriving at their predictions.

5. To identify counselors who were most and least accurate in making the various predictions; and to compare them on tests of ability, interest, and personality, in addition to biographical data to determine if differences can be observed.

6. To compare group and individual counselor predictions with actuarial predictions of campus leadership activity.

Chapter II

RELATED RESEARCH

The clinical versus statistical prediction controversy has received increasing attention in the psychological literature over the past 25 years, particularly in the last decade. The primary reason for this upsurge is that prediction has become a basic problem in applied psychology. Applied problems in industry, the military services, educational institutions, and in other situations make forecasting necessary. However, predictions are obviously useful only to the extent that they are valid and efficient. Proponents of both sides of the argument agree to this, and the controversy basically centers around which method of prediction-making (clinical or statistical) is most effective and economical or, stated more correctly, under what circumstances is one method better than the other.

In addition to the many statistical prediction investigations dealing with applied problems, other aspects of this argument have also received considerable attention. A logical analysis was presented by Reichenback (1938), and the psychological and theoretical aspects have been argued by many people who have tended to align themselves in one camp or the other (Allport, 1937; Chein, 1945; Holt, 1958; Hunt, 1959; McArthur, 1954 and 1956; and Sarbin, 1944). Zubin (1956) has argued that the statistical-clinical controversy is a pseudo-problem. In addition, Cattell (1937), Cronbach (1960), and Guilford (1959) have been concerned with the psychometric aspects of prediction.

The most definitive work in this area is Meehl's monograph (1954) which presents a critical review of the literature in addition to a logical and theoretical analysis of this argument. Meehl has also published a number of other important papers on this topic (1956a, 1956b, 1956c, 1957, 1959a, 1959b, and 1960).

No attempt will be made here to review all of the pertinent literature related to this investigation since in addition to Meehl's review in 1954, an excellent review was recently made by Gough (1962). Of the published research specifically concerned with the clinical-statistical controversy, only a few were conducted in an educational setting. These will be reviewed here, as will published studies concerned with the prediction of leadership activity.

Clinical-statistical Studies Conducted in an Educational or Training Program

The first such study specifically designed to compare clinical and statistical predictions was doctoral dissertation by Sarbin (1941). Five clinical counselors in the Student Counseling Bureau at the University of Minnesota were asked to make predictions of first-quarter grades on an eight-point scale. Four of the five counselors possessed the doctorate degree and all had "considerable experience" in clinical counseling of University students (Sarbin, 1941, p. 45). The sample consisted of 162 freshmen (73 men and 89 women) who entered the College of Science, Literature and the Arts at the University of Minnesota in the fall quarter of 1939.

Statistical predictions were made from a regression equation which included high school percentile rank and a college aptitude test. This regression equation was based upon a previous sample, making Sarbin's sample serve as the cross-validation group.

The data used by the counselors to make the clinical predictions were considerably in excess of the two variables included in the regression equation. The information available to the counselors included the preliminary interviewer's case notes, the Strong Interest Blank scores, the Darley Personal Inventory scores, and eight-page Individual Record Form filled out by each student, plus the high school rank and ACE information used in making the statistical predictions. In addition, other test scores of aptitude, achievement, interest, and personality were available for some of the students included in the sample. Some of the counselor predictions were not made until four to six weeks after a student was seen. The number of predictions made by the five counselors ranged from 9 to 41 cases.

Correlations were computed between the criterion and the predictions made by the counselors and from the regression equation. No significant difference was found between the predictive efficiency of the two methods.

	Men	Women	Total
Clinical	.35	.69	.56
Statistical	.45	.70	.60

Some of the counselors felt that there was no practical value in the refined eight-point prediction scale, and some thought that they might do better merely making predictions of "success" or "failure". Sarbin dichotomized the criterion variable at the honor-point ratio of C and re-analyzed the data. For male students there was still no statistically significant difference between the two methods, although the statistical method was slightly superior. For females, statistical predictions were superior to the counselor predictions at the .05 level of probability. When the data for both sexes were combined, the statistical method was superior at the .02 level of confidence.

Sarbin also found that the counselors' predictions correlated higher with the two predictor variables in the regression equation than did the criterion variable. These results were interpreted to indicate that the counselors over-weighted or over-estimated the contribution of these variables in making their predictions. He concluded that "... the clinical method takes data with known weight and applies other weights which are much less efficient" (1941, p. 74). He also found that counselors significantly over-estimated the actual honor-point ratios, which the statistical predictions did not do. This is termed the error of leniency.

Both the counselor and statistical methods systematically underestimated the criterion variance. This is characteristic of the statistical regression phenomenon, and Sarbin concluded that the counselors correspondingly were "playing safe" in making their predictions.

Sarbin does not present data indicating whether any of the individual counselors were able to predict better than the regression equation. The five counselors made re-ratings six months after the initial predictions and the reliability correlations ranged from .64 to .88.

An unpublished study by Chauncey, reported by Meehl (1954), compared statistical predictions with clinical predictions made independently by three members of the freshman dean's office for 100 students who entered Harvard in 1936. The statistical predictions for this random sample of students were based on high school rank and College Board Examination scores. In addition to these two variables, the clinical judges also had letters of recommendation, information on extracurricular activities, and a statement by the student as to his reasons for entering Harvard. The validity correlations obtained by the three judges and the statistical predictions were all in the 60's with the statistical validity ranking second of the

four. The difference between the "best" clinician and the statistical coefficient was not statistically significant.

Bobbit and Newman (1944) conducted a study at The Coast Guard Academy where the efficiency of statistical and clinical predictions were compared. Statistical predictions were made from an unweighted battery of aptitude, achievement, and personality tests. The clinical predictions were made by two clinicians (one psychologist and one psychiatrist) who had access to all of the test information. In addition, the clinicians had short interviews with students ranging from ten to twenty minutes before making their predictions. Although the interviewers' ratings were from 2 to 7 per cent better, no significance tests were mentioned and not enough data were published to allow such tests. The addition of the interview ratings made by the clinicians to the unweighted test battery increased the percentage of "hits" an additional 2 to 3 per cent. Although the slight advantage favored the clinicians, the method used to make the statistical predictions gave the clinicians an unfair advantage. First, optional weights were not used in making the statistical predictions, and, secondly, the test distributions reported were quite homogeneous for the sample of students studied.

Later research by these same investigators (1948) revealed that the interview had been eliminated from the selection procedures of the Academy, apparently because the additional effort required by the interviewing was not justified in terms of the slight increase in predictive efficiency.

Dunlap and Wantman (1944) compared the predictive efficiency of an objective test battery and the judgements made by a team of three

(a psychologist, a personnel man, and an aviator) in predicting success of pilot training. A total of 308 pilot trainees were interviewed at four different universities. The predictor variables were correlated with a large number of criteria of success which varied from school to school. However, the clinical judges did not have the same data available as were used in the statistical predictions and a valid comparison of the two methods could not be made. It was possible, however, to compare the interviewers' over-all ratings of "fitness for flight training", which were based upon the trainees' responses to a personal history questionnaire, with a weighted scoring of the questionnaire. There appeared to be no significant differences resulting from this comparison. Although the authors were not specifically concerned with comparing the clinical-statistical predictions, they did conclude that the inclusion of the interviewers' ratings in the multiple regression did not greatly improve the multiple correlation found using only the objective data.

Conrad and Satter (1945) attempted to predict the success of Naval trainees in an electrician's mate school by comparing the predictions of interviewers using test scores, personal history data, and impressions gained from an interview with statistical predictions using the results of only two objective tests of electrical knowledge and arithmetic reasoning. The criterion of success was grades achieved by the trainees (N=3500) in the school. The results showed that the statistical predictions were slightly better than the "clinical" predictions, although the statistical predictions were not cross-validated. Under cross-validation the slight difference favoring the statistical predictions might have vanished.

A study by Lepley and Hadley (reported by Meehl, 1954) was conducted as an effort to comprehensively evaluate cadets being considered for flight training during World War II. The Surgeon's Classification Board, which carried out the investigation, was composed of a flight surgeon and an aviation psychologist. Interviews were conducted with 1524 cadets whose stanine scores were below the standards required. Of these, 285 were sent to pilot's training school on the recommendation of the interviewers. Follow-up data were obtained for 259 of these cadets, who were matched on the basis of tests with 146 cadets sent to training at an earlier date when standards were lower. The most notable part of the analysis involved comparing the 68.9 per cent of the cases passed by the board who actually failed in training with the 73 per cent of the matched group who failed. These results revealed that the judgments made by the board did not significantly increase the efficiency of predicting success under these circumstances.

Bloom and Brundage (1947) reported a study involving a sample of 37,862 Naval enlisted men who entered training schools for nine types of specialized training. The validity of interviewers' classification ratings was studied in relation to a criterion of success in training. The interviewers had test information available to them in making their judgments. The correlation between the interviewers' ratings and success in training was lower than the correlation obtained for test scores alone.

The reports by Kelly and Fiske (1948, 1950, 1951) provide some data bearing upon the clinical-statistical argument. These reports were concerned with the assessment of clinical psychology trainees. Correlations between the criteria of success and individual test scores, which included the Miller Analogies test, the psychologist scale of the Strong Vocational

Interest Blank, and some of Gough's Multiphasic keys, suggested a multiple correlation at least equal to the judgments made by clinicians using the same test and documentary data. The median validity coefficient for the clinicians' predictions based upon objective test scores plus a credential file was only .29. Because of the likelihood of shrinkage occurring if the non-psychometric data had been excluded from the clinical judges in making their predictions, Meehl (1954) interprets this part of the Kelly-Fiske study as leaning in favor of the statistical predictions.

In a doctoral dissertation at the University of Minnesota, Melton (1952) compared statistical and clinical predictions of first-year grades for 543 freshmen who entered the College of Science, Literature, and the Arts. The statistical predictions were based upon a two-variable regression equation which included the ACE and high school rank. The regression equation was determined using a different sample, and was cross-validated on the sample used in Melton's study. Clinical predictions were made by fourteen counselors who were graduate students in psychology or in educational-psychology. In addition to the ACE and HSR, the counselors had results for the Cooperative English Test, the Mooney Problem Check List, and a four-page personal inventory form to use in making their predictions. The results indicated that the mean absolute error of the statistical predictions was significantly less than the absolute error made by counselors. Melton also found that the counselors over-estimated honor-point ratios and that there were significant differences among counselors in their average error. Eleven counselors were less accurate than the actuarial predictions and three were slightly more accurate.

Truesdell and Bath (1957) compared clinical and actuarial predictions of attrition and survival in the Division of Engineering at Iowa State College. Predictions were made on a sample of 100 students three academic years after their admission into the engineering program, with the attrition-survival rates taken into account. Clinical judgments were made by nine judges who were placed into three groups on the basis of amount of clinical experience. The Kuder Preference Record, the Guilford-Martin Inventory of Factors GAMIN, the Guilford Inventory of Factors STDCR, and college first-quarter grade-point average were available to the judges to use in making their clinical predictions. Statistical predictions were made using a discriminant function equation that was determined on the entire group of students from which the sample of students was drawn for this study. Therefore, the statistical predictions were not cross-validated. The discriminant function variables were: first-quarter GPA, the Computational and Scientific scales of the Kuder, the Ascendance-Submission scale (Guilford-Martin), and the Rhathymia and Social Introversion scales (Guilford). The authors concluded that the statistical and clinical predictions were approximately equivalent. The three groups of judges did not differ significantly among themselves on their clinical predictions.

SUMMARY

None of the studies reviewed here found that clinical predictions were clearly superior to the same predictions made actuarially. The collective weight of the evidence provided by the studies conducted thus far indicates that statistical predictions are at least equal to and most are superior to the same predictions made by clinical judges. It is particularly

important to note, however, that the predictions in these studies are "institutional" as opposed to "individual" (Cronbach and Gleser, 1957). Thus, the evidence indicates that the optimal weighting of variables statistically seems to be superior for making the "institutional" type of prediction where a group of some type is involved and averages are used. Yet, no adequately controlled and conducted study of any type has been reported where clinical predictions were significantly better than statistical predictions.

After reviewing all of the clinical versus statistical literature, Meehl (1957) observed that of twenty-seven studies reported seventeen showed a definite superiority for the statistical method, and the other ten showed the two methods to be of about equal efficiency.

Many of the studies that have compared clinical and statistical predictions have serious shortcomings. Some of these are:

1. The statistical weights in prediction equations were not cross-validated.
2. Optimal weighting methods were not used in making statistical predictions.
3. Some studies did not require clinicians to make predictions for all cases, whereas statistical predictions were made for all cases.
4. The skill and qualifications of the clinicians making the predictions were not delineated.
5. Some studies failed to indicate the predictive accuracy of each counselor.
6. Most studies did not indicate whether the clinicians were making use of all of the information at their disposal.
7. Clinicians were not asked to indicate how confident they were in their predictions.

Prediction of Leadership Activity

No studies were found in the literature where attempts were made to compare clinical and actuarial predictions of student campus leadership activity. Although many studies have been published that were concerned in some way with leadership activity, few of these were directly applicable to the present investigation.

Many studies have been conducted in business and industrial settings (e.g., Bridgman, 1930; Jepsen, 1951; 1951; Tarnopol, 1958), as well as in the military services (e.g., Greene, 1948; Jenkins, 1947; Sells, 1949; Williams and Leavitt, 1947). Other studies have attempted to determine some relationship between participation in high school extra-curricular activities and later leadership participation in college and in occupational situations (e.g., Auble and Auble, 1953; Benerd, 1953; Clem and Dodge, 1933; and Trump, 1954). Williamson, Layton, and Snoke (1954) attempted to describe the salient characteristics of students who participated in extracurricular activities at the University of Minnesota.

In a review of the literature, Stogdill (1948) was concerned with identifying personal factors associated with leadership. After reviewing over 120 studies, he concluded that:

"The evidence suggests that leadership is a relation that exists between persons in a social situation, and that persons who are leaders in one situation may not necessarily be leaders in other situations. Must it be assumed that leadership is entirely incidental, haphazard, and unpredictable? Not at all. The very studies which provide the strongest arguments for the situational nature of leadership also supply the strongest evidence indicating that leadership patterns as well as non-leadership patterns of behavior are persistent and relatively stable." (Stogdill, 1948, p.65).

Most attempts to predict leadership have occurred in the military services. Drucker (1957) listed 38 studies that were concerned with the prediction of leadership in the Army. He concluded from these studies that

ratings of leadership performance in the Army can be successfully and usefully predicted by a number of testing devices. He reported that ratings of performance in leadership training situations correlate up to .50 with later effectiveness ratings, both in combat and noncombat assignments. Measures of mental ability and academic success were found to have little or no relationship with military leadership performance.

Creager and Miller (1956), in studying leadership at the Air Force Academy, reported that multiple correlations as high as .49 were found with the leadership criterion.

The dearth of collegiate studies of this type is probably due to the difficult problem of defining leadership. On most campuses record-keeping is such that it is very difficult to differentiate students on campus leadership participation.

Chapter III

PROCEDURES

This investigation was divided into three main parts for the three types of predictions studied. The results for each of the three types of predictions were reported in a separate chapter. Chapter IV was concerned with predictions of students' academic achievement; Chapter V studied counselors' predictions of whether students would remain in the major programs they initially selected at the time of admission to college; and Chapter VI investigated counselor and actuarial predictions of student campus leadership activity.

For predictions of students' academic achievement, both first-year grade average and over-all grade average earned in college were investigated. Counselor or clinical predictions were compared with actuarial predictions on the number of hits correctly predicted and on correlation coefficients obtained between predicted grades and grades actually earned. A hit was defined as a correct dichotomized prediction for a student to earn a grade-point average of "C or higher" or a grade average of "less than C", based upon grades actually earned.

The predictions were made under three different conditions. Different amounts of case information were available for the different conditions for use in making predictions.

Accuracy in prediction-making was assessed for counselors individually and for the three groups of counselors who worked in different settings. A fourth group was composed of judges with no counseling experience, which allowed for comparisons to be made between groups of counselors and non-

counselors. Other factors that were investigated in relation to predictions of first-year and over-all college grades were:

1. Reliability of counselor predictions.
2. Counselors' confidence in their predictions in relation to predictive accuracy.
3. Amount of counselor experience in relation to accuracy of predictions.
4. Counselor estimations of weight placed upon available case information in arriving at predictions.
5. Counselor consistency in use of case information in relation to accuracy of predictions.
6. Counselor self-ratings of general effectiveness in relation to accuracy of predictions.
7. A comparison of counselors who were most and least accurate in making predictions. Comparisons were made on biographic and psychometric information, and on the weights placed upon case information used in making predictions.

The second type of prediction required counselors to state whether they thought students would remain in the major programs they initially selected upon admission to college. This type of prediction was included in this study to attempt to determine if counselors differed in their ability to make such a prediction.

A hit was recorded when a counselor correctly predicted whether a student would or would not remain in the program he initially selected, which was contingent also upon predicting whether or not the student would be successful academically. That is, if a student was not successful academically in his studies he automatically did not remain in his major program. Thus, if a student was predicted to be academically unsuccessful and the student actually was unsuccessful, a hit was recorded because the student did not remain in his initial major. If a student was correctly predicted

to succeed academically, the counselor then had to correctly predict whether or not the student remained in his initially selected program to be given a hit. A counselor's score for hits was simply the total number of predictions he was able to make correctly for each of the conditions under which predictions were made.

A change of major was essentially determined by a transfer to a different college at the University of Minnesota, or to a different department within the same college. If a student withdrew from the University he was considered to have been unsuccessful in completing his degree program. Of the sample of 100 students included in this investigation, 53 did not finish any four-year academic program successfully at Minnesota. However, of the 53 who did drop out, 43 had less than a C average at the time of the withdrawal.

Students' initial major choices were determined from the Minnesota College Admission Form, which was filled out as a part of the regular admission procedure. Initial major choices were compared with what students actually majored in at the University. The student's ultimate vocational objective, which was indicated on the admission form, was also an important factor in determining change of major. This was particularly true for students who planned to enter pre-professional undergraduate programs. For example, in deciding whether a student would remain in his pre-medicine program, the counselor was actually deciding about the appropriateness of medical school for that student.

It was possible for the counselor to predict any combination of circumstances in which students might find themselves. In the case of the pre-medicine student, for example, the counselor could predict that medical school was not appropriate, but predict instead that the student would

change his major (without having to specify which one) and complete another undergraduate program successfully.

Because of the difficulty in making such a gross prediction, flexibility was necessary in determining a change of major. For example, a student who became interested in teaching history at the high school level rather than teaching geography, as indicated on the admission form, was not considered a change in major.

Accuracy in making predictions about majors was determined for counselors individually and for counselors who worked in different educational settings. Comparisons were also made with predictions made by a group of naive judges. Other factors that were investigated were:

1. Counselor confidence in predictions in relation to accuracy of predictions.
2. Counselor experience in relation to accuracy of predictions.
3. Counselor estimations of weight placed upon available case information in arriving at predictions.
4. Consistency in the use of case information in relation to accuracy of predictions.
5. Counselors' self-ratings of their own general effectiveness in relation to accuracy of predictions.
6. A comparison of counselors most and least accurate in making "major" predictions. Comparisons were made on biographic and psychometric information, and on weights placed upon case information used in making predictions.

The third type of prediction that counselors made was students' participation in campus leadership activity. This phase of the study was included as exploratory research to attempt to determine whether counselors were able to make such a prediction efficiently; and, likewise, to determine the efficiency with which such a prediction could be made actuarially.

Another important part of this phase of the study was to compare the predictive accuracy of the actuarial and clinical methods in making this prediction.

Campus leadership activity was defined, and a copy of this definition is included in the Appendix of this report.

Information pertaining to the actual amount of campus leadership activity participation for the students included in this investigation was obtained from the records of the Student Activities Bureau. This Bureau keeps records of the names of students who have filled leadership positions for all duly recognized campus groups and organizations. Positions were identified that met the definition of leadership used in this study, positions that were competitively sought after by students, and then the records searched to determine which students in this study had acquired such positions. This was done for students in both the criterion and cross-validation samples (which are defined later in this chapter).

A number of different leadership positions were identified that had to be sought after in order to be acquired, positions that also entailed some responsibility. Many such positions are found in student government organizations; in academic, professional, and honorary fraternities; and in residential organizations. Other such positions were identified in religious and interfaith organizations, as well as in special interest organizations. All such groups authorized and recognized by the Student Activities Bureau regularly send to this Bureau the names of the students filling the leadership positions. The lists covering the four year period of 1959-1960--1962-1963 were checked in determining whether students were classified as leaders or non-leaders.

This search revealed that only fourteen of the 100 students in the criterion sample had obtained leadership positions of the type defined,

and only 17 students in the cross-validation sample had obtained such positions. Because of the small number of leaders found (although this is about the proportion that might be expected), students were classified into two groups: leaders and non-leaders.

Counselors made their predictions of leadership activity for students on a nine-point scale which ranged from "very active" to "never active". However, as indicated, it was more appropriate to study this prediction using a two-group classification of leader and non-leader. Therefore, all counselor predictions on the first three points of the nine-point scale were classified as "leader" predictions and the remainder were classified as "non-leader" predictions. The number of hits for each counselor was determined by counting the number of leader and non-leader students correctly classified.

Actuarial predictions were made using a two-group discriminant function analysis. Since the number of leaders in each of the two samples was small for statistical purposes, it was decided to combine the two samples to increase the stability of the results. Therefore, the leader group included 31 (17 from one sample and 14 from the other), and the non-leader group included 169.

The variables to be included in the discriminant function equation for prediction purposes were determined by comparing the means of the leader and non-leader groups on each of the predictor variables (identified later in this chapter). From this comparison, 25 were identified from application of the *t* test with *t*'s that were significant at the .05 level or better. These variables are identified in Chapter VI.

Using an equation developed on both samples, "predictions" were then made for the same sample of students for which the clinical predictions

were made. That is, "predictions" were made for students in the cross-validation sample, but these same students were a part of the total sample that was used in developing the discriminant function equation. These were not predictions, then, in the true sense.

In addition to the comparison of the actuarial and clinical predictions of leadership activity, other factors that were investigated were:

1. The predictive accuracy of the counselor and non-counselor groups.
2. Assessment of the predictive accuracy of individual counselors.
3. Estimated weights placed upon the case information by the counselor and non-counselor groups in making leadership activity predictions.

Counselors

Counselors from three different educational settings and a fourth group composed of non-counselors made the clinical predictions for this study. Counselors from the Student Counseling Bureau at the University of Minnesota, counselors from the Lower Division Advisors Office in the College of Science, Literature, and the Arts of the University of Minnesota (hereafter called Arts College counselors), and high school counselors participated in this study.

Biographic and psychometric information were obtained for each of these counselors. A copy of the questionnaire requesting biographic data is included in the Appendix of this report. The test information collected for these counselors included:

1. The Miller Analogies Test (MAT)
2. The Strong Vocational Interest Blank (SVIB) - Men
3. The Minnesota Multiphasic Personality Inventory (MMPI)
4. The Edwards Personal Preference Schedule (EPPS)

The purpose of the questionnaire was to provide descriptive information about the counselor groups, and to provide possible means for differentiating between the most and least efficient counselors in making predictions. The test information was also used for the latter purpose.

Student Counseling Bureau Counselors. Twelve counselors (six males and six females) from this Bureau were included in this study. The average age of these counselors was about 43 years. Approximately 70 per cent of their fathers and mothers had an education of high school or less. The majority ($N = 7$) were natives of Minnesota, and they were raised in towns that widely varied in size. Six held doctor of philosophy degrees, two had doctor of education degrees, and three others were candidates for the Ph.D. at the University of Minnesota. The other counselor held a MS degree and had additional course-work in psychology. They had taken on the average about 25 quarter-hour credits of measurement and statistics courses, and earned a mean grade average of about A-. They had published an average of seven technical articles or books. Almost all were active in professional organizations, belonging to the American Personnel and Guidance Association (APGA) and the American Psychological Association (APA). Almost all were members of the state psychological association and to an area vocational guidance association. They had an average of slightly over nine years of counseling experience. These counselors, then, were the most highly trained and experienced group of counselors participating in this study.

Students are provided a wide range of services at this Bureau. Counselors talk with students about their education and vocational plans, their academic problems, educational progress, and social, personal, or emotional problems. Major emphasis, however, is placed on educational and vocational problems.

Arts College Counselors. Fourteen counselors (nine males and five females) from this college participated in the investigation. Their average age was 31.5 years. About 62 per cent had mothers with a high school education or less, and 85 per cent had fathers with an education of high school or less. About 62 per cent were natives of Minnesota, and they came from towns that ranged widely in size.

One of these counselors had recently earned a doctor of philosophy degree in educational psychology from the University of Minnesota, while the other counselors were graduate students in various departments. Six were candidates for doctorate degrees and seven were working toward masters degrees. Of the Ph.D. candidates, two were in educational psychology, two in political science, and the others were in philosophy and English. The seven masters candidates were in different departments ranging from art history to child development. Therefore, most of these counselors had received little or no formal training related to counseling. None of these counselors belonged to professional associations such as APA or APGA.

These counselors had on the average 2.4 years of counseling experience, not all of which had been gained in the Arts College. A few had served in other positions such as residence hall counselors. As Lower Division Arts College Counselors, their primary duties were to discuss with freshmen and sophomore students their educational objectives and to assist in planning course programs. They had direct contact with the type of student (Arts College freshmen males) composing the sample for which predictions were made in this study, but they had less formal counselor training than any of the other counselor groups.

High School Counselors. Forty high school counselors from Minneapolis, St. Paul, and the surrounding area took part in this study. The Directory of Minnesota Public School Counselors for 1962-1963 was used to identify 180 high school counselors as possible participants. Counselors were identified who lived in a radius of approximately 30 miles from the University of Minnesota, where the study was conducted. A stratified sample of 26 males and 14 females was selected at random and invited to participate. These numbers of males and females represented the proportion of each sex in the population from which this sample was drawn.

Counselors were invited to participate by letter, a copy of which is included in the Appendix. A second letter was sent, which is also in the Appendix, if the counselor was interested in participating. If for some reason a counselor could not participate, another counselor was selected at random (depending on the sex) to take part in this study. To attain the desired number of 26 males, a total of 34 males were contacted before this quota was reached. To attain 14 women, it was necessary to contact a total of 31. However, these counselors were not contacted until late in the school year and many, particularly the females, already had made other plans that conflicted with this study.

The average age of these counselors was about 40 years. About 67 per cent had mothers with an education of high school or less, and about 72 per cent had fathers with a high school education or less. About 75 per cent were raised in Minnesota, and almost 50 per cent came from small towns of 2,500 or less. None of these counselors held doctorate degrees, but 35 had an MA or MS degree. The other five had earned graduate credits but had not yet acquired a masters degree. They had a mean of 13 credits of measurement and statistics courses, with a grade average of B.

Whereas these counselors did little professional writing (a total of 13 journal articles written), they were very active in professional and community organizations. An average of over 21 hours per month was spent in activities of this type. Whereas only one was a member of APA, 34 belonged to APGA. All 40 were members of the Minnesota Counselors Association. They averaged 6.7 years of counseling experience. All of them were full-time counselors, and most of their time was spent actually counseling. However, a portion of their time was spent performing other duties routinely required of high school counselors.

Non-Counselor Judges (hereafter referred to as the NC group). A total of 45 naive judges made the same predictions as the three groups of counselors. These naive judges were primarily freshmen and sophomore students drawn from the subject pool of the Psychology Department of the University of Minnesota. These students were taking introductory psychology courses and volunteered to participate in experiments such as this one in order to receive additional credits in their courses. Names of these subjects were drawn at random. Since the design of this study called for the same predictions to be made for the same cases (the counselors making the predictions did not know this) with three different amounts of information available, 15 different naive judges made predictions for each of the three phases. It was necessary to use different judges for each condition because of the limitations of time which students had available. The reason for the inclusion of this group was to allow for comparisons of predictive efficiency to be made between trained and untrained counselors.

Sample of Students

Two samples of 100 students each were selected from the freshmen males who entered the College of Science, Literature, and the Arts (SLA) at the University of Minnesota in the fall quarter of 1959. One sample served as the criterion group for determining the optimal weightings for the variables used in making the actuarial predictions, and the second group served as the cross-validation group for which both clinical and actuarial predictions were made.

The names of 200 students for the two samples were selected at random from a list containing the names of all freshmen males entering the Arts College that quarter. However, the following criteria were necessary for final inclusion of a student in this study: (1) graduation from a Minnesota high school during the spring of 1959; (2) a Minnesota College Admission Form was available; (3) a *Personal Inventory for Entering Students* was available; (4) test scores were available which included the Minnesota Scholastic Aptitude Test (MSAT), the Cooperative English Test (CET), the Social Studies Test of the Sequential Tests of Educational Progress (STEP-SS) battery, the Strong Vocational Interest Blank (SVIB), the Minnesota Multiphasic Personality Inventory (MMPI), and high school rank (HSR); and (5) the student must have remained in SLA for at least one quarter.

The names of students who did not meet the above criteria were discarded and other names drawn at random. This procedure was continued until the desired number of students were identified for both samples.

Although the counselors made predictions for 375 case folders, predictions were actually made for only 100 students. Counselors were

not aware that they were making the same predictions for the same student with three different amounts of information available. In addition, within each of the three phases or conditions, 25 cases were randomly selected to check the reliability of counselors' predictions. These reliability cases were not used in determining the number of "hits" for each counselor. Therefore, counselors made predictions for the same 100 students under three different conditions, and within each of the three conditions made the same predictions two times for 25 cases. This meant that 125 case folders were presented to counselors under each of the three conditions. Hits were determined for the first 100 cases, excluding the 25 used for reliability purposes.

Case folders were given an identification number and all information was removed that could have identified the student in any other way. This made it impossible for counselors to know that the same 100 students were involved. Case folders were presented to counselors in the same order for making predictions. Counselors first completed their predictions for the 125 case folders included in Condition I, then the 125 case folders for Condition II, and last the 125 folders for Condition III.

The mean freshman year grade average for these 100 students was 1.93, with the standard deviation being .84. The overall college GPA mean was 2.06, and the standard deviation was .82.

Predictor Variables

Counselors made predictions about students' academic achievement, whether students would be successful in the major programs they initially selected, and campus leadership activity with three different sets of information

available. The information presented to counselors for each of these three conditions is listed below. An answer sheet for the third condition is included in the Appendix. Answer sheets for Conditions I and II were identical except that fewer variables were available for use in making predictions.

Condition I. The data available in each of the 125 case folders for this condition included:

- (1) Student's age
- (2) Name of the high school from which student graduated
- (3) High school percentile rank (HSR)
- (4) Plans for academic major
- (5) Results of the Minnesota Scholastic Aptitude Test (MSAT)
- (6) Results of the Cooperative English Test (CET), which included subparts called the Mechanics of Expression and the Effectiveness of Expression
- (7) The last high school grade earned in the areas of math, English, social studies, and natural science
- (8) STEP Social Studies Test (STEP-SS)

Both the raw scores and percentile ranks using Arts College freshmen norms were given for each of the above tests.

Condition II. All of the information available in Condition I was also available in Condition II. In addition, each case folder for Condition II included a Strong Vocational Interest Blank (SVIB), and a Minnesota Multiphasic Personality Inventory (MMPI).

Condition III. All of the data available in Condition II was also available in Condition III folders. In addition, Condition III folders

included considerable biographic information given on the Minnesota College Admission Form and the Personal Inventory for Entering Students (both forms are included in the Appendix of this report), plus three kinds of statistical data from which a statistical prediction could have been made. One kind of statistical data was in the form of expectancy tables for HSR and MSAT, each giving the chances in 100 for a student making a B or higher, a C or higher, or a D or higher. The second kind of statistical data was a matrix of zero-order and multiple correlations between first year grades and HSR, MSAT, and CET for each of five colleges at the University of Minnesota. The third kind of statistical data was a multiple regression equation for the four high school grades (math, English, social studies, and natural science) that could be used to predict first-year grades for Arts College males. If a counselor wanted the predicted grades from this equation, it was necessary for him to compute them himself. The statistical data available to counselors are included in the Appendix.

Predictions from the data provided in Condition I used essentially information related to scholastic ability and past academic achievement. The additional interest and personality information provided in Condition II made it possible to assess the effect these additional data had on predictive efficiency. Condition III essentially included all of the data that could be compiled for students before they enter the Arts College. This was the logic for presenting the data under three different conditions.

Actuarial predictions of achievement were made from regression equations that included various combinations of the variables available to counselors in the three conditions. From the Minnesota College Admission Form and the Personal Inventory for Entering Students, ten variables were

quantified and used in one of the equations. These ten biographical variables were: fathers' education, mothers' education, level of fathers' occupation, number of brothers and sisters, degree of family financial support, amount of previous work experience, anticipated number of hours of work per week while in college, number of high school activities, number of high school offices held, and number of anticipated college activities.

Chapter IV

PREDICTIONS OF ACADEMIC ACHIEVEMENT

Predictive Accuracy of Counselor Groups

Summary data for the mean number of hits (as defined in Chapter III) for the three groups of counselors and the non-counselor (NC) group for first-year grade predictions are given in Table 1. These means were based on the number of hits that counselors were able to predict correctly out of the 100 cases for which predictions were made under each of the three conditions.

Table 1

Summary Data for Number of Hits for Counselor Groups
in Predicting First-year GPA

Groups	Conditions						Total	
	I		II		III			
	Mn	SD	Mn	SD	Mn	SD	Mn	SD
HS	67.0	7.1	67.4	8.1	67.6	7.9	67.3	6.1
AC	67.7	7.2	67.5	6.8	64.3	9.6	66.5	8.1
SCB	71.2	4.3	70.3	5.3	71.3	5.9	70.9	5.2
NC	64.4	7.3	62.1	8.5	62.5	7.2	63.0	7.7
Total	67.2	7.1	66.9	8.0	66.6	8.3		

An analysis of variance was computed on these data, using the procedure described by Walker and Lev (1953, p. 381) for unequal subclass frequencies. This was necessary because the number of counselors in the group varied. This analysis assessed the significance of the differences among the counselor group means, as well as the differences among means for the three conditions under which predictions were made. These results are presented in Table 2.

Table 2

Analysis of Variance Results for Counselor Groups
for Number of Hits Predicted for First-year GPA

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Groups	94.45	3	31.48	8.74	.01
Conditions	2.75	2	1.38	<1	
Interaction	8.44	6	1.41	<1	
Error		231	3.60		

The F of 8.74 for groups was significant at the .01 level of probability, suggesting that the differences among the means for the counselor groups probably were not due to chance factors. SCB counselors consistently predicted with greater accuracy than any of the other groups with the NC group, as would be anticipated, doing the poorest job of predicting. There was little difference between the mean hits for AS and AC counselors.

The F for conditions was not significant at the .05 level, which suggests that having additional amounts of case information available in conditions II and III did not significantly affect counselor predictive accuracy. That is, the additional information available to counselors for making predictions neither increased nor decreased predictive accuracy as reflected by group means. Although no hypothesis was made in this study as to the results that might be expected, a logical argument could be made that either of these two possibilities might occur. An increase in predictive accuracy could have been expected on the grounds that additional data would give counselors greater knowledge about the cases for which predictions were made and, thus, result in greater accuracy. On the other hand, it could also be argued that more information would result in counselor

confusion about which data to use and the result would be that predictive accuracy would decrease. As indicated, the results in this study showed that neither of these possibilities happened. The number of hits remained about the same regardless of the amount of data available.

Since the means for the counselor groups were very similar across the three conditions, critical ratios (CRs) were computed between groups using the total means and standard deviations presented in Table 1. The total mean number of hits for the SCB group was found to be significantly greater (.01 level or better) than the mean for any of the other groups. The CR between the SCB and the NC group was 5.48; the CR between the SCB and the HS group was 3.45; and the CR for the SCB and AC group was 2.95. The HS and AC counselors averaged significantly more hits than the NC group, with the CRs being 3.39 (.001 level) and 2.06 (.05 level), respectively. The CR between the HS and AC means was not significant at the .05 level of probability.

A comparison of counselor group predictive efficiency was also made using correlation coefficients (r 's) between predicted and actual first-year GPAs. The mean r for counselors in each of the groups is listed in Table 3. Observation of the r 's given in this table reveals that they were very similar for each of the groups across the three conditions, which concurs with the finding that the mean number of hits was very similar from condition to condition. The test for the significance of the difference between non-independent r 's, as described by Edwards (1950, p. 85), was used to assess the differences between the "total" mean r 's for these groups.

Table 3

Mean Correlation Coefficients Between Predicted and Actual
First-year and Over-all GPA's for Counselor Groups

Groups	Conditions						Total Mean	
	I		II		III		1	2
	1	2	1	2	1	2		
HS	.58	.50	.59	.50	.57	.49	.58	.50
AC	.59	.52	.59	.51	.56	.51	.58	.51
SCB	.60	.52	.61	.52	.63	.51	.61	.52
NC	.53	.46	.53	.47	.56	.48	.54	.47

1 = First-year GPA r's

2 = Over-all college GPA r's

Using this test, none of the obtained t's between any two of the r's approached significance at the .05 level. The largest correlation difference occurred between the SCB and NC r's ($r .61 - r .54 = .07$), with the obtained t being 1.23.

For first-year predictions, then, these groups were found to differ on the number of hits correctly predicted, but were found to be very similar on the correlations. The former required predicting a dichotomy of "C or better" or "less than C" for each student, whereas the latter required, predicting a specific GPA along the continuum of A to F.

Summary results for the number of hits correctly predicted for over-all college academic performance are presented in Table 4. (Over-all college performance of "pass" or "fail" was based only upon grades earned at the University of Minnesota.

Table 4

Summary Data for Number of Hits for Counselor Groups
in Predicting Over-all College Grades

Groups	Conditions						Total	
	I		II		III			
	Mn	SD	Mn	SD	Mn	SD	Mn	SD
HS	58.3	5.1	59.3	5.7	60.5	4.9	59.5	5.3
AC	59.9	6.7	62.6	5.6	60.4	7.3	61.0	6.7
SCB	62.8	3.9	63.5	3.8	64.8	4.5	63.7	4.2
NC	57.7	5.8	58.9	5.2	58.9	7.1	58.5	6.1
Total	59.3	5.6	60.4	5.7	60.8	4.6		

The F-ratio of 7.81, shown in Table 5, for assessing the significance of the differences among group mean hits was significant at the .01 level. As was the case with predictions of first-year grades, SCB counselors obtained a greater total mean number of hits for the over-all grade predictions than any of the other groups. Since the F value for conditions was not significant at the .05 level, it was possible to use the total means for all conditions to test the differences between groups. The total mean number of hits for the SCB counselors was significantly greater than the HS and NC means at the .001 level, with the CR's being 4.94 and 4.52 respectively. The SCB total mean was greater than the AC mean at the .05 level (CR = 2.16). No other differences between means were significant at that same level.

Table 5

Analysis of Variance Results for Counselor Groups
for Number of Hits Predicted for Over-all GPA

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Groups	46.4	3	15.47	7.81	.01
Conditions	5.0	2	2.50	1.26	
Interaction	3.9	6	.65	<1	
Error		231	1.98		

The non-significant F value for conditions indicates that counselors' predictive efficiency was not increased or decreased by having additional data available to use in making these predictions. Having the SVIB, the MMPI, biographical, and statistical information appeared to affect predictive accuracy to a negligible extent.

The F for the interaction term was not significant at the .05 level, suggesting that the means for the counselor and non-counselor groups were independent of the conditions under which predictions were made.

An assessment of predictive efficiency was also made with the r's obtained for counselors between predicted and actual over-all college grades earned by the CLA freshmen males in this sample. The means for the counselors composing the various groups are listed in Table 3. Applying Edwards' test for testing the difference between non-independent r's, none of the obtained t's between the r's for any two groups ever approached significance at the .05 level. As seen from Table 3, the largest difference between any two r's was only .05 (.52 - .47), and these were the correlations for the SCB and NC groups.

Several factors seem to be of particular importance in connection with the results presented in this section. One is that SCB counselors as a group were superior to any of the other groups in predicting "C or better" and "below C" for both first-year and over-all college grades. The HS and AC counselors were able to predict hits for first-year grades with greater accuracy than the NC group, but they were not able to do so for predictions of over-all grade hits. Although a number of factors might be operating, one factor that might well be of considerable importance in attempting to account for these results is simply the place of employment. SCB counselors work with students at all collegiate levels (and occasionally with high school students as well), whereas HS and AC counselors do not. Although AC counselors occasionally work directly with college students at the advanced educational levels, their primary responsibility is advising freshmen and sophomores. HS counselors have little opportunity to work directly with students at the collegiate level, although considerable effort is spent helping their high school student plan for college.

It could be reasoned, then, that all of these counselors should have some notions about factors that are significantly related to the hypothetical construct of "freshmen achievement"; and, therefore, all should be able to predict with greater accuracy than the NC group which has had no such experience. Perhaps it could also be reasoned that because of factors such as more counseling experience and more formal training that SCB counselors would be somewhat more accurate than the HS or AC counselors at making predictions of first-year grades. The traditional Minnesota emphasis on measurement might also be a factor related to the SCB group superiority over the other groups in that SCB counselors are highly trained and skilled in the use of tests.

In relation to predictions of over-all college grades, the fact that SCB counselors work with students at all levels whereas the HS and AC counselors do not could well be an important factor in attempting to determine why the SCB group was superior. The best explanation for the lack of superiority of the HS and AC counselors over the NC group seems to be that these two groups of counselors have not had sufficient experience to have a very clear understanding of the construct of "over-all college achievement". Therefore, their predictions of this criterion do not appear to be much more sophisticated than predictions made by non-counselors.

Some possible reasons for the lack of differentiation among the counselor groups on the correlation coefficients will be discussed in a later section of this chapter. It should be stated at this point, however, that the NC group was able to predict with surprising efficiency, the r 's being higher than was expected. The size of the r 's obtained by the NC group are very comparable to r 's often used by admissions committees to predict achievement. Thus, the reason for lack of significance between the counselor group r 's and the NC r 's was not that the former groups did poorer than expected but that the NC group did better than anticipated.

Reliability of Counselor Group Predictions

In addition to comparing these counselor and non-counselor groups on predictive efficiency, it is also important to know something about the reliability of their predictions. With similar data available, do counselors arrive at consistent predictions?

Reliabilities for counselors were determined by having them make the same predictions two times for twenty-five cases in each of the three conditions.

Counselors were asked to make predictions for 125 cases under each condition, but the final 25 were cases for which predictions had already been made in the first 100 cases. (The counselors did not know this.)

Mean reliability r's for the counselor and non-counselor groups for each condition are presented in Table 6.

Table 6

Mean Reliability r's for the Counselor and Non-counselor Groups for First-year and Over-all College GPA Predictions

Groups	Conditions						Total Mean	
	I		II		III		1	2
	1	2	1	2	1	2		
HS	.82	.81	.86	.86	.85	.84	.84	.84
AC	.85	.83	.87	.87	.87	.82	.87	.84
SCB	.86	.84	.92	.90	.90	.90	.89	.88
NC	.80	.73	.82	.83	.81	.81	.81	.79

1 = r's for first-year GPA's

2 = r's for over-all college GPA's

Inspection of this table reveals two factors of importance. The first is that these reliabilities were quite high, indicating that counselors were very consistent in their predictions made two times for the same cases. Second, the counselor and non-counselor group mean reliabilities were very similar. Perhaps it is not so surprising that the counselor groups would be similar on these r's, but it is surprising that the NC group predicted with such high consistency for the same cases.

It is also interesting that the reliabilities were consistently high regardless of the amount of case information available in the three different conditions.

Counselor Group Predictions Versus Actuarial Predictions

A major concern of this study is the comparison of actuarial and clinical predictions. This section deals with the comparison of actuarial predictions with the mean predictions for each of the counselor and non-counselor groups.

Summary results for the number of hits correctly predicted by the counselor and non-counselor groups in predicting first-year GPA's were given in Table 1. The number of hits for the over-all college grade predictions were listed in Table 4.

The number of hits correctly predicted by the actuarial method of multiple regression are presented in Table 7. Five different equations for each of the GPA predictions were developed on the criterion sample and cross-validated on the same sample of 100 students for which the counselors made clinical predictions. Three of the five equations for each of the two GPA predictions used variables that were presented to counselors in condition I since HSR, MSAT, and CET are the three variables most commonly used by the Arts College (University of Minnesota) for selection purposes. One equation included HSR and MSAT, the second used a combination of HSR, MSAT, and CET, while the third included all variables presented in condition I. The fourth equation was composed of all condition II variables with the exception of the SVIB. The SVIB has repeatedly been found to be unrelated to academic achievement, and the additional 48 variables from this test would have made the regression equation too cumbersome. The fifth equation included all of the variables in the fourth equation plus 11 additional variables. Ten of the new variables were biographical data, and the other was predicted first-year GPA using the equation given in condition III.

Table 7

Number of Hits and r's Predicted Actuarially for First-year and Over-all College GPA's Using Various Combinations of Variables

	Variables in Prediction Equation	First-Year		Over-all	
		Hits	r	Hits	r
	a. HSR + MSAT	75	.63	69	.53
Cond. I	b. HSR + MSAT + CET	75	.64	67	.54
	c. HSR + MSAT + CET + CEEB-SS + HS math, Eng., SS, & MS grades + HS Size (total of 9 variables)	71	.65	67	.57
Cond. II	- The Cond. I variables + NMPI (total of 22 variables)	78	.68	72	.59
Cond. III	- The Cond. II variables + 10 biographical variables + Predicted GPA (total of 33 variables)	79	.69	71	.61

The mean number of first-year hits made from these five equations was 75.60, and the standard deviation was 2.80.

Comparisons were made between the mean number of hits determined from the equations and the total mean number of hits for each of the counselor and non-counselor groups. Because of the heterogeneity of the variances, it was necessary to use the procedure described by Edwards (1950, pp. 106-107) for testing the differences between means when the variances are not homogeneous. The t obtained between the actuarial mean and the SCB mean was 2.85, which is significant at the .05 level. The t between the actuarial mean and the AC mean was 4.82 (<.01 level). The t of 5.50 found between the actuarial and HS group means was significant beyond the .01 level. The actuarial mean was significantly higher than the NC mean beyond the .01 level, the t being 6.92.

For predictions of over-all college grades, the actuarial predictions were superior to the predictions of each of the other four groups. The obtained t 's between the actuarial predictions and the HS, AC, SCB, and NC groups were 8.58, 5.62, 4.42, and 7.79, respectively, all of which were significant beyond the .01 level of probability. The mean number of over-all college GPA hits made actuarially was 69.20.

Comparisons were also made for the r 's between predicted and actual grades obtained by the students in the sample. The mean r 's for the counselor and non-counselor groups are listed in Table 3, and the r 's resulting from the various combinations of variables included in the regression equations are shown in Table 7.

The mean r 's for first-year grades for the HS, AC, SCB, and NC groups were .58, .58, .61, and .54, respectively. Using only HSR and MSAT in a regression equation, an r of .63 (Table 7) was obtained between the predicted and actual first-year grades. Application of the t test for dependent r 's indicated that the difference between the NC r (.54) and the actuarial r (.63) was significant at the .05 level of probability (1-tailed test), but none of the other differences between counselor group r 's and the actuarial r of .63 was significant at that level.

The actuarial r obtained from the nine variables included in condition I was .65, but this r was not significantly different from .58 which was the size of the r for both the HS and AC groups. However, the actuarial r obtained from using all the variables in condition II (except the SVIB) was .68, and this was significantly different from .58 at the .05 level.

The SCB r of .61 was not significantly different from the actuarial predictions regardless of the number of variables included in the regression

equation, although the r of .69 obtained from all condition III variables (except the SVIB) approached significance at the .05 level.

For the predictions of over-all grades earned in college, the r 's resulting from the use of equations which included HSR and MSAT ($r = .53$) and HSR, MSAT, and CET ($r = .54$) were not significantly different (.05 level) from the NC group mean of .47; but the r of .57 obtained from the use of all condition I variables was different from the NC mean at the .05 level (1-tailed test). The r obtained actuarially from the use of all the case variables in condition III (except the SVIB) was significantly more efficient than the mean r for any of the three counselor groups.

In summary, the actuarial predictions of achievement were superior to the clinical predictions of counselors for hits for both first-year and over-all college grade predictions. Although none of the counselor groups predicted as efficiently as the actuarial predictions for hits, a few counselors were able to predict as many hits as the actuarial predictions when only HSR and MSAT (the most commonly used variables) were included in the equation. This is a relevant finding and more will be reported about this in a later section of this chapter.

There was less certainty about the superiority of the actuarial predictions over the clinical predictions when the entire distribution of predicted grades was considered through the use of correlation coefficients.

Perhaps it is worthwhile speculating why the actuarial predictions were unquestionably superior to the clinical predictions for hits while there was less certainty about the actuarial superiority for the r 's. One very important reason is simply that the statistical techniques used in the assessment of hits were more powerful than the techniques used with the r 's.

Particularly in connection with the fact that testing the difference between r 's, which were based upon the means for groups, ignored the number of counselors involved in determining the mean. With this procedure, many degrees of freedom were lost because the number of counselors composing the groups was not taken into account.

Actually, this is ironical in that another procedure could have been employed for comparing the actuarial and clinical predictions where literally thousands of degrees of freedom would have been available and almost any difference would have been significant. This procedure would have involved finding the difference between the predicted and actual grades for every student for the actuarial and clinical predictions. Since each counselor made 300 predictions for the three conditions, that many degrees of freedom would have been available for each counselor. Thus, for example, a total of 3,600 degrees of freedom would have been available for the SCB group alone. One-hundred degrees of freedom would have been available also for the actuarial predictions from the use of any of the equations. Such a procedure would very much load the dice in favor of the actuarial predictions, since these predictions would be based upon optional weightings for the variables; and a very small mean difference between the actuarial predictions and the predictions for any one of the counselor groups would have been highly statistically significant because of the large number of degrees of freedom available.

Another point in connection with the small differences found between the actuarial and clinical r 's is that the counselor groups were able to predict better than was expected. It was anticipated that a large range of r 's would be found within the counselor groups for both first-year and

over-all college grade predictions. However, inspection of Table 8 reveals that the distributions of r 's were both quite high and very homogeneous. For first-year GPA predictions, 55 of the 66 counselors obtained r 's between .55 and .65, a difference of only .10 correlation points. Forty-four counselors obtained r 's between .50 and .60 for the over-all college GPA predictions.

Therefore, as validity coefficients go, the mean r 's for the counselor groups were high. Thus, although the mean r 's were high for these groups, the differences between the groups were small. This also meant that the actuarial r 's resulting from predicted and actual grades had to be extremely high to be significantly different.

Finally, there does not seem to be a ready explanation for the homogeneity of the r 's found for the counselor groups, leading to the conclusion that there was little difference among counselors in their ability to predict grades for the entire range of A to F.

Predictive Accuracy of Individual Counselors

In this section individual counselor's predictions of first-year and over-all grades are compared with the same predictions made by non-counselors and by actuarial methods. Individual counselor predictions are also compared with the base rates for students included in the sample of this study.

The number of hits correctly predicted and the r 's between predicted and obtained grades are presented for each counselor in Table 8. These data provide information about the efficiency with which each counselor was able to predict both first-year and over-all college grades.

Table 8

Number of Hits and r's for Each Counselor for Each Condition

Counselor No.	Condition I				Condition II				Condition III				Mn for All Conditions			
	1st-year		Over-all		1st-year		Over-all		1st-year		Over-all		1st-year		Over-all	
	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r
HS 1	70	.60	59	.49	76	.59	52	.50	77	.64	59	.55	74	.61	57	.51
2	59	.54	62	.43	72	.41	64	.41	64	.57	56	.47	65	.51	61	.44
3	70	.41	62	.44	74	.59	70	.52	68	.37	62	.37	71	.46	65	.44
4	71	.62	53	.50	70	.64	53	.64	72	.59	54	.50	71	.62	53	.55
5	59	.53	63	.51	62	.60	71	.52	72	.63	73	.58	64	.59	69	.54
6	65	.64	49	.55	63	.65	52	.59	71	.65	58	.53	68	.65	53	.56
7	71	.51	58	.42	74	.58	58	.48	75	.58	61	.46	73	.56	59	.45
8	71	.60	64	.48	71	.64	59	.49	72	.62	68	.54	71	.62	64	.50
9	71	.66	59	.55	57	.55	55	.54	61	.20	51	.17	63	.47	55	.42
10	76	.62	69	.54	72	.56	62	.53	68	.65	63	.53	72	.61	65	.53
11	64	.60	59	.58	58	.54	59	.60	53	.26	57	.19	58	.47	58	.46
12	72	.59	63	.48	69	.62	60	.54	77	.62	68	.57	73	.61	64	.53
13	73	.60	57	.50	72	.65	54	.58	71	.60	60	.50	72	.62	57	.53
14	73	.58	65	.50	68	.56	65	.48	72	.64	63	.57	71	.59	64	.52
15	51	.54	54	.41	38	.65	51	.56	58	.60	57	.49	49	.60	54	.49
16	73	.59	52	.48	74	.58	51	.47	62	.60	58	.50	70	.59	54	.48
17	66	.67	49	.51	77	.65	52	.47	71	.70	56	.54	71	.67	52	.51
18	59	.57	54	.34	65	.58	47	.45	55	.56	50	.47	60	.57	50	.42
19	69	.63	59	.48	72	.55	63	.40	68	.63	64	.51	70	.60	62	.46
20	62	.51	54	.53	56	.54	56	.53	55	.58	62	.56	58	.54	57	.54
21	61	.58	57	.54	59	.53	58	.40	72	.55	66	.53	64	.55	60	.46
22	74	.61	68	.55	74	.66	66	.59	82	.59	67	.56	77	.62	67	.57
23	70	.66	64	.59	69	.67	71	.59	72	.64	65	.59	70	.66	67	.59
24	76	.60	56	.50	74	.47	60	.54	78	.60	59	.51	76	.56	58	.52
25	68	.53	62	.50	60	.62	66	.46	65	.57	66	.28	64	.57	64	.41
26	62	.58	56	.49	57	.61	59	.48	56	.65	60	.58	58	.61	58	.52
27	66	.64	60	.62	69	.60	63	.57	65	.63	63	.55	67	.62	62	.58
28	74	.59	54	.51	69	.58	63	.55	58	.58	62	.59	67	.58	60	.55
29	68	.63	65	.55	64	.64	63	.56	68	.55	63	.48	67	.61	64	.53
30	72	.59	58	.50	74	.60	56	.55	73	.61	65	.59	73	.60	60	.55
31	74	.63	68	.50	78	.66	67	.48	75	.64	65	.55	76	.64	67	.51
32	53	.58	52	.51	63	.56	55	.47	63	.62	57	.52	60	.59	55	.50
33	67	.59	50	.51	70	.61	56	.55	73	.63	57	.55	70	.61	54	.54
34	70	.61	58	.52	73	.64	58	.49	71	.62	58	.50	71	.62	58	.50
35	65	.64	58	.54	67	.63	55	.53	63	.61	52	.46	65	.63	55	.51
36	72	.54	61	.32	78	.59	54	.48	73	.62	62	.48	74	.58	62	.43
37	46	.64	61	.52	61	.43	59	.38	63	.17	60	.15	57	.41	60	.35
38	54	.58	61	.56	56	.55	64	.43	44	.59	53	.54	51	.57	59	.51
39	74	.62	52	.49	78	.64	54	.42	75	.61	61	.47	76	.62	56	.46
40	69	.34	59	.42	63	.53	60	.39	74	.56	59	.39	69	.48	59	.40

(Table 8 contd.)

Table 8 (contd.)

Counselor No.	Condition I				Condition II				Condition III				Mn for All Conditions			
	1st-year		Over-all		1st-year		Over-all		1st-year		Over-all		1st-year		Over-all	
	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r	Hits	r
AC 41	71	.61	67	.52	74	.72	64	.55	73	.64	65	.53	73	.66	65	.53
42	76	.65	60	.59	76	.65	63	.54	77	.63	67	.56	76	.64	63	.56
43	63	.56	61	.51	70	.60	68	.52	47	.55	51	.50	60	.57	60	.51
44	61	.61	59	.54	60	.61	58	.52	62	.61	64	.56	61	.61	60	.54
45	67	.57	50	.49	66	.51	65	.55	68	.58	55	.56	67	.55	57	.53
46	69	.60	60	.51	75	.64	62	.51	70	.59	62	.49	71	.61	61	.50
47	73	.62	63	.52	71	.59	62	.51	74	.59	67	.53	73	.60	64	.52
48	74	.53	59	.48	59	.56	67	.56	47	.54	49	.50	60	.54	58	.51
49	54	.57	53	.56	54	.56	53	.46	49	.50	52	.44	52	.54	52	.49
50	73	.62	69	.52	70	.56	66	.48	67	.48	67	.52	70	.55	67	.51
51	76	.59	71	.53	73	.57	68	.52	70	.59	70	.56	73	.58	70	.60
52	70	.59	66	.53	65	.58	72	.53	65	.41	66	.41	67	.53	68	.54
53	68	.57	51	.46	73	.57	53	.49	69	.53	49	.48	70	.56	51	.56
54	53	.55	50	.48	59	.49	56	.42	62	.58	61	.45	58	.54	56	.53
SCB 55	77	.62	68	.53	72	.62	63	.48	77	.60	69	.51	75	.61	67	.60
56	71	.63	61	.46	73	.43	65	.52	78	.68	65	.50	74	.58	64	.57
57	69	.58	68	.52	72	.65	67	.49	68	.64	66	.47	70	.62	67	.59
58	68	.57	60	.55	74	.54	64	.44	76	.65	64	.49	73	.59	63	.58
59	71	.61	66	.64	71	.62	67	.59	70	.63	67	.54	71	.62	67	.64
60	66	.57	60	.49	63	.66	64	.55	75	.65	62	.49	68	.63	62	.61
61	78	.64	70	.57	78	.63	71	.60	79	.61	67	.46	78	.63	69	.62
62	75	.62	58	.52	70	.61	59	.49	69	.62	60	.54	71	.62	59	.61
63	73	.63	60	.38	66	.68	60	.62	62	.57	59	.58	67	.63	60	.62
64	74	.56	62	.49	75	.61	57	.51	68	.60	57	.55	72	.59	59	.59
65	69	.55	59	.49	71	.60	60	.40	73	.63	69	.44	71	.59	63	.55
66	63	.65	62	.55	58	.64	65	.61	60	.62	73	.58	60	.64	67	.65

Nos. 1-40: High School Counselors

Nos. 41-54: Arts College Counselors

Nos. 55-66: Student Counseling Bureau Counselors

In the assessment of the predictive efficiency of individual counselors, the mean number of hits and r 's for all three conditions were used. This was because the condition under which predictions were made had little affect upon predictive accuracy for the several groups of counselors (Table 2).

The first concern was an attempt to determine which of the individual counselors from the HS, AC, and SCB groups could predict with greater efficiency than the mean for the NC group. The NC group judges averaged 63 hits (Table 1) for first-year predictions, and a chi square test revealed that 76 hits would be the minimum number of hits required to predict better than the NC average at the .05 level of probability (1-tailed test). Inspection of Table 8 reveals that six counselors had a mean of at least 76 hits for their first-year predictions.

On the other hand, a chi square test found that 49 hits were necessary for a counselor to predict significantly poorer (.05 level) than the NC group mean of 63. Table 8 shows that one counselor had a mean that low and, therefore, actually predicted with less efficiency than the average NC counselor was able to do.

For the r 's between predicted and actual first-year grades, the mean NC group r was .54 (Table 3). Using the t -test for non-independent r 's, it was found that an r of .63 was required to predict significantly better (.05 level, 1-tail) than the NC group average of .54. Eleven of the 66 counselors had mean r 's of .63 or higher. An r of .40 was necessary to predict with significantly less efficiency (.05 level, 1-tail) than the NC group mean r , and none of the counselors had r 's that low. It is of interest to note, however, from Table 8 that 11 of the HS and AC counselors had mean r 's equal to or below the NC mean of .54. (No SCB counselors had a mean r that low.)

For predictions of overall grades, the NC group averaged about 59 hits for each of the conditions under which predictions were made (Table 3). Chi square indicated that a frequency of 73 hits was required for a counselor to have a significantly higher mean than the NC group mean at the .05 level (1-tail). Table 8 shows that not a single HS, AC, or SCB counselor obtained a mean that high and, therefore, none were able to predict hits for over-all grades significantly better than the NC average at that level of probability.

The mean NC group r for predicted and actual over-all r 's was .47 (Table 3), and the t -test for non-independent r 's revealed that an r of .57 was required to be significantly higher than the NC mean r at the .05 level (1-tail). Again, inspection of Table 8 shows that five counselors had mean r 's that reached at least .57. On the other hand, an r of .34 was needed to be significantly below the NC mean r (.05 level, 1-tail), and no counselor had a mean r that low.

When compared with the predictions made by non-counselors, then, these results point out that in terms of statistical probability few counselors could predict better than the NC group. It was stated in a previous section of this chapter that the non-counselors were able to predict with surprising efficiency, and these data need to be interpreted in that light. It does not seem to be so much a matter of the counselors predicting generally poorly as it does that the non-counselors were able to do so well.

In comparing individual counselor predictions of first-year hits with the actuarial predictions, Table 7 pointed out that two variables (HSR and MSAT) correctly predicted 75 out of the 100 cases. Observation of Table 8 indicates that seven counselors averaged 75 or more hits for the three conditions. It is noteworthy that the number of hits (76) required

for counselors to predict more efficiently (at the .05 level) than the NC group average was almost identical to the 75 hits correctly predicted from HSR and MSAT. That is, the number of hits needed to predict more efficiently than the NC group mean was also about the number of hits needed to equal the actuarial predictions using two variables. However, only one counselor was able to equal the number of hits correctly predicted from the fourth equation which included all of the variables included in condition II except the SVIB.

It can also be seen from Table 7 that HSR and MSAT alone produced an r of .63 between predicted and actual first-year grades. Table 8 shows that eleven counselors obtained mean r 's at least that size. Of these eleven counselors, four had mean r 's at least .65, which was the r obtained for the actuarial predictions when all nine variables of condition I were included in the regression equation.

For actuarial predictions of over-all scholastic achievement, HSR and MSAT predicted 69 of the cases accurately in terms of the dichotomy of "C average or better" or "less than C average" (Table 7). However, only three counselors had a mean of 69 or more hits (Table 8) for these same predictions.

Also for actuarial predictions, an r of .53 was found between actual over-all college grades and grades predicted from a regression equation that included only HSR and MSAT. Table 8 shows that 23 of the 66 counselors obtained r 's of that magnitude or better. All nine variables included in condition I raised the r to .57 (Table 7) and only five counselors had r 's that high. It is noteworthy, however, that these results indicate that many of

the individual counselors were able to predict as well as the actuarial predictions when the two variables (HSR and MSAT) most heavily emphasized by SLA for admission purposes are considered.

Results presented in a previous section emphasized the superiority of the actuarial predictions over the average predictions of the three groups of counselors. The results provided in this section reveal that even when counselors are studied individually few of them can match the actuarial predictions. This is very definitely the case as more variables are included in a regression equation for making actuarial predictions. However, it is of considerable importance that a few counselors were identified who were able to consistently predict with considerable accuracy. More will be said about these counselors (the most efficient versus the least efficient) in a later section.

It is also interesting to view the means for first-year hits for individual counselors in Table 8 in relation to the base rate. In the present sample of 100 SLA freshmen males for whom predictions were made, 57 had first-year GPA's of less than a C average and 43 had GPA's of a C average or better. Therefore, if all 100 students were predicted to have a GPA of less than a C average, 57 of the predictions would be recorded as hits. Table 8 reveals that only four of the 66 counselors had mean hits of 57 or less. Thus, almost all of the counselors were able to at least equal the base rate.

A chi square test revealed that 71 hits would be the minimum frequency required to predict better than the base rate at the .05 level of probability (1-tail). Table 8 shows that 30 of the individual counselors, or almost half, were able to reach at least that number of hits for first-year predictions.

For predictions of over-all college achievement, 47 of the 100 students in the sample graduated from the University of Minnesota (or were close to graduation at the time of this investigation) and 53 withdrew from their programs. Therefore, 53 hits would be recorded if all students were predicted not to succeed academically. Inspection of the individual counselor means presented in Table 8 shows that all but four counselors were able to at least equal the base rate of 53.

To predict more accurately than the base rate of 53, chi square revealed that a frequency of 67 hits would be necessary for significance at the .05 level (1-tail). Further inspection of Table 8 shows that 12 counselors had a mean of at least 67 and, therefore, were able to predict better than the base rate at that level of statistical probability.

In summary, data presented in this section showed that while most counselors were at least equal to the non-counselors in making predictions of first-year and over-all college achievement, few counselors were able to predict significantly better than the non-counselors. One reason for these results seems to be that the non-counselors were able to predict with greater effectiveness than expected.

Predictions of achievement made actuarially were found to be superior to the clinical predictions of individual counselors. This was true for both first-year and over-all college predictions. However, a few counselors were able to equal the actuarial predictions when only a small number of variables were included in the regression equation.

Almost all of the individual counselors were able to at least equal the base rates in predicting first-year and over-all college achievement. While almost one-half of the counselors were able to predict significantly

better than the base rate for first-year grade predictions, only about one-fifth predicted significantly better than the base rate for over-all college grade predictions.

Amount of Counseling Experience in Relation to Predictive Accuracy

Each of the 66 counselors who participated in this investigation indicated on a questionnaire the counseling experience he had accumulated. From this information the amount of experience was determined and each counselor was placed into one of four experience categories. The amount of experience was determined by counting the number of years in which some proportion of an individual's time was spent counseling. While the great majority had always served as "full-time" counselors, a few counseled as little as one-quarter time during certain years; and in two cases the amount of time spent counseling was less than one-quarter.

The four experience groups were:

- I - 2 years or less experience (N = 16)
- II - 3 to 5 years of experience (N = 20)
- III - 6 to 10 years of experience (N = 20)
- IV - 11 years or more experience (N = 10)

Summary data for these four experience groups in predicting "C or better" or "less than C" averages for first-year GPA's are presented in Table 9.

Table 9

Summary Data for the Number of Hits for Counselors
Experience Groups in Predicting First-year GPA

Experience Groups	Conditions						Total	
	I		II		III		Mn	SD
	Mn	SD	Mn	SD	Mn	SD		
I	69.7	6.1	66.9	6.1	66.3	6.7	67.7	6.5
II	64.6	6.2	66.5	7.0	64.3	9.9	65.0	7.9
III	69.3	6.5	69.7	6.5	71.2	6.6	70.1	6.6
IV	68.9	7.7	69.0	10.7	69.1	6.8	69.0	8.5
Total	67.9	6.9	67.9	7.5	67.6	8.3		

From the analysis of variance results given in Table 10, it can be seen that the F for groups was significant at the .05 level, suggesting that differences among the means for groups of counselors with various amounts of experience were not due to chance factors. The means for these groups (Table 9) indicate that counselors with at least six years of experience obtained more hits than counselors with less than that amount of experience.

The F for conditions was not significant (.05 level), suggesting that the amount of information available to these counselors for making predictions had no noticeable effect upon predictive accuracy. The F value for the interaction term was not significant at the .05 level.

Table 10

Analysis of Variance Results for Counselor Experience Groups for Number of Hits Predicted for First-year GPA

Source of Variation	Sum of Squares	d.f.	Mean Square	F	P
Groups	41.19	3	13.73	3.74	.05
Conditions	.39	2	.19	<1	
Interaction	10.74	6	1.79	<1	
Error		186	3.67		

The mean r's between predicted and obtained first-year grades for these experience groups are presented in Table 11. Observation of this table shows that the total mean r's for all three conditions were virtually identical. Three of the groups had a total mean r of .59 while the other had a total mean of .58.

Table 11

Mean Correlation Coefficients Between Predicted and Actual First-year and Over-all GPA's for Experience Groups

Experience Groups	Conditions						Total Mean	
	I		II		III		1	2
	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>		
I	.61	.53	.59	.53	.55	.50	.58	.52
II	.59	.50	.60	.51	.58	.49	.59	.50
III	.58	.49	.59	.50	.58	.49	.59	.49
IV	.58	.51	.57	.51	.61	.52	.59	.51
Total Mean	.59	.51	.59	.51	.58	.50		

1 = First-year correlations
2 = Over-all correlations

For the predictions of overall college grades, the mean number of hits for each of the experience groups for each condition is listed in Table 12, with the analysis of variance results pertinent to these data shown in Table 13. The F ratio for groups was significant at the .05 level, suggesting that the amount of experience counselors had was related to predictive accuracy. However, this finding is somewhat peculiar in that the mean for counselors with three to five years experience was lower than the means for the other groups, which were more or less undifferentiated. Although it is difficult to reason why the counselors with two years or less experience should obtain a higher mean number of hits than the three to five year group, it is obvious that accuracy in this prediction is not linearly related to amount of experience. That is, experience per se does not appear to be related to accuracy.

Table 12

Summary Data for the Number of Hits for Counselor
Experience Groups in Predicting Over-all GPA

Experience Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
I	61.3	6.3	62.3	5.0	61.6	7.2	61.7	6.2
II	57.2	5.1	59.5	6.4	58.7	5.9	58.5	5.9
III	60.2	4.7	60.3	5.3	62.8	3.3	61.1	4.7
IV	61.0	4.9	61.8	5.6	62.7	4.4	62.0	5.0
Total	59.7	5.5	60.8	5.7	61.3	5.7		

The F's for conditions and the interaction term were not significant at the .05 level.

Table 13

Analysis of Variance Results for Counselor Experience Groups for Number of Hits Predicted for Over-all GPA

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Squares</u>	<u>F</u>	<u>P</u>
Groups	22.33	3	7.44	3.58	.05
Conditions	5.08	2	2.54	1.22	
Interaction	4.19	6	.70	<1	
Error		186	2.08		

The mean r 's between counselor predictions of over-all college grades and grades actually achieved are presented in Table 11 for the experience groups. As was found with the first-year r 's, the over-all mean r 's for these groups were very similar. The total mean r 's ranged only from .46 to .52, giving little reason to believe that amount of counseling experience was related to predictive efficiency for these groups when assessed in this manner.

Although evidence has been found that amount of experience seems to be related at least in some way to predictive accuracy for hits, these results must not be interpreted without taking into account the individual counselors composing the four experience groups. For example, Group IV consisted of ten counselors with eleven or more years experience, five of whom were SCB counselors and five HS counselors. For the number of hits for first-year grade predictions, the five SCB counselors averaged 73 (the total SCB group average was 70.9) and the five HS counselors averaged only 65 (the total HS group mean was 67.3). The combined mean for these ten counselors was 69 hits. However, the point is that the five most experienced SCB counselors were more accurate than the average SCB counselor, giving

some evidence that amount of experience was related to predictive efficiency. Furthermore, these five SCB counselors were among the most efficient of all counselors included in this investigation. But the five most experienced HS counselors averaged considerably fewer hits than was average for that group of counselors. Therefore, amount of experience for HS counselors was negatively related to accuracy.

Viewed in this light, it is very doubtful that amount of experience per se is related to counselor predictive efficiency, but must be interpreted among other things in terms of where the experience was acquired. There very likely are a number of reasons why the most experienced SCB counselors were among the best at making these predictions and the most experienced HS counselors were among the poorest, but finding such reasons is not a primary concern here. The main point is that the relationship of predictive accuracy and amount of experience is not independent of where the experience was gained.

Another obvious example of this can be seen by inspecting the total means for the experience groups in Table 8 for first-year hits. The total mean number of hits for counselors with three to five years of experience was less than the mean number of hits for counselors with two years or less experience.

Further analyses were conducted in an attempt to find out more about the relationship of experience and predictive accuracy. This was done by assessing whether predictive accuracy was linearly related to years of experience within each of the HS, AC, and SCB groups. Table 14 gives the frequency of counselors within each of these groups with a given number of years of experience.

Table 14

Frequency of Counselors Within Each Counselor Group
with Given Number of Years of Experience

<u>Years of Experience</u>	<u>Counselor Groups</u>			<u>Total</u>
	<u>HS</u>	<u>AC</u>	<u>SCB</u>	
2 or less	4	10	2	16
3-5	15	3	2	20
6-10	16	1	3	20
11 or more	5	0	5	10

Table 14 shows that the distribution of HS counselors for the four experience classifications was 4, 15, 16, and 5, respectively. The corresponding number of hits for first-year grade predictions for these four experience classifications were 65.5, 65.9, 70.0, and 65.0, respectively. Thus, when looked at in this way there seemed to be some evidence that amount of experience is related to predictive efficiency if counselors with eleven or more years experience are excluded from consideration. The r 's for these same four groups of HS counselors were .57, .59, .58, and .58, respectively.

The fourteen AC counselors were distributed 10, 3, 1, and 0 into the four experience groups, respectively. This reveals that the great majority of AC counselors had two years or less experience, with the mean number of hits for first-year predictions for the group being 69.0. The mean number of hits for the other four counselors with at least three years of experience was only 60.3. So in this case counselors with less experience did a better job of predicting than did the counselors with the most experience. The r 's for these two experience groups were both .58.

Table 14 shows that the distribution of the twelve SCB counselors was 2, 2, 3, and 5, respectively, for the four experience groups. The mean number of first-year hits for the four SCB counselors (the first two groups were combined) with five years or less experience was 68.5, the mean for the 6-10 years group was 70.3, and the mean for those with eleven years or more experience was 73.0. Thus, as was the case for HS counselors (with the most experienced group dropped), amount of experience appeared to be associated with predictive efficiency for SCB counselors. However, the r 's for these three SCB experience groups were very similar at .63, .61, and .60.

All of the results presented thus far for years of counseling experience within the HS, AC, and SCB groups have dealt with predictions of first-year grades. For hits in relation to over-all college grade predictions, the means for the four experience classifications for HS counselors were 59.5, 58.2, 60.6, and 59.6, respectively. This indicated that there was very little differentiation among these groups, and suggested that there was little or no relationship between amount of experience and predictive accuracy for over-all grade hits.

Furthermore, experience did not appear to be related to predictive efficiency for SCB counselors either. The mean number of over-all hits for counselors with five years or less experience was 63.6, the mean for those with six to ten years experience was 63.4, and the mean for the most experienced group was 64.0.

On the other hand, AC counselors with two years of experience or less appeared to do slightly better than the AC counselors with three or more years experience, the means for these groups being 62.4 and 58.7, respectively.

Perhaps several relevant observations can be made about these findings. First, it is interesting to observe that whereas the amount of counseling experience was linearly related to accuracy in predicting first-year grade hits for HS and SCB counselors, an opposite trend was found for AC counselors. While it is not easy to ascertain rationally why such a relationship should exist for AC counselors, these results place further emphasis upon the situation where experience is acquired as being a crucial factor in determining the relationship between experience and predictive accuracy.

However, in attempting to offer one possible explanation for these inconsistent results, another factor of relevance should be mentioned. This is the fact that even though the new AC counselors had practically no formal counselor training and had little experience, they were able to predict first-year grade hits as well as SCB counselors with up to five years of experience, and at least as well as (if not better than) HS counselors with five years or less experience. Both the HS and SCB counselors had received considerably more formal counselor training. Therefore, the best explanation for this seems to be that the new AC counselors' proficiency in making this prediction (first-year hits) was the result of extensive informal training received. These new AC counselors worked directly with the type of students for whom predictions were made in this study. The informal training received by these new AC counselors would account for their proficiency in comparison with HS and SCB counselors who had even more experience, and would, at the same time, account for the negative relationship found within the AC group for amount of experience and accuracy.

This informal training probably helped the new AC counselors mentally build a construct of relevant factors that were related to the criterion being predicted. HS counselors do not work directly with Arts College students at the University of Minnesota and, thus, have less opportunity to develop a construct of freshman male scholastic performance. Therefore, it may be possible to speed-up predictive efficiency of counselors by orienting them on the criterion that is being used in making predictions.

The finding that amount of experience within the HS, AC, and SCB counselor groups was not associated with predictive accuracy for the over-all college grade hit predictions is puzzling. Perhaps regardless of the amount of experience, counselors continue to be hazy and unclear about the "construct" of over-all college performance. (Although the total SCB group was previously found to be superior at making this prediction than the HS and AC groups.)

Counselor Confidence in Predictions of Achievement in Relation to Predictive Accuracy

I - Counselor Groups

In making predictions about students' probable scholastic achievement, counselors were asked to indicate the degree of confidence they had in each prediction made. The degree of confidence in a prediction was made on a nine-point scale, ranging from "Very confident" to "Not at all confident". However, in the statistical manipulations of these data, three classifications of confidence were used in assessing the relationship between confidence and predictive accuracy. The most confidence classification included points 1, 2, and 3 on the nine-point scale; the moderate

confidence classification included the 4, 5, and 6 points; and the least confidence classification consisted of the 7, 8, and 9 points.

The degree of counselors' confidence in their predictions in relation to predictive accuracy was assessed in two ways. The first was a group approach in which the predictions of counselors in the HS, AC, and SCB groups were pooled into the "most", "moderate", and "least" confidence classifications and an assessment then made for predictive accuracy. A second assessment was made for individual counselors on the basis of the average degree of confidence each counselor had in the predictions he made.

What was done in the first of these approaches can be best understood by inspecting the data presented in Table 15 for the hit predictions for first-year grades. This table shows for each of the three counselor groups the per cent of hits for predictions in which counselors were most, moderate, and least confident. For example, HS counselors averaged being correct about 72 per cent of the time (the mean for all three conditions) for the predictions in which they were most confident; and they were right on about 62 per cent of the predictions in which they expressed least confidence.

Table 15

Per Cent Hits for Most, Moderate, and Least Confident
Predictions of First-Year Grades Made by
Each of the Counselor Groups for Each Condition

Condition	Degree of Confidence			Mn %
	Most	Moderate	Least	
HS				
I	72	66	62	67
II	72	67	60	66
III	71	67	65	68
Mn %	72	67	62	67
AC				
I	75	68	60	68
II	73	67	63	68
III	71	66	56	64
Mn %	73	67	60	67
SCB				
I	76	66	70	71
II	74	70	67	70
III	76	69	67	71
Mn %	76	68	67	71

A simple analysis of variance was computed on these data, and the obtained F of 27.37 was significant at the .001 level of probability. This result indicated that counselors' degree of confidence in their predictions was related to accuracy, with counselors being correct more often for predictions in which they were most confident than for predictions in which they were least confident. This, of course, is what would be anticipated in that counselors tend to be most confident about predictions in which a student's academic ability and past achievement are consistently high or low, but least confident where ability and past achievement are quite inconsistent. Another point to be noted from this table is the relative consistency of hit accuracy for the three confidence classifications from condition to condition within each of the counselor groups.

More information about confidence in relation to accuracy is obtained by investigating separately those cases where students were predicted to earn a C average or better and cases in which students were predicted to obtain less than a C average for first-year grades. These data are shown in Tables 16 and 17.

Table 16

Per Cent Hits for Most, Moderate, and Least Confident Predictions of "C or Better" Average for First-year Grades

Condition	Degree of Confidence			Mn %	
	Most	Moderate	Least		
HS	I	69	55	45	56
	II	68	55	43	55
	III	69	54	45	56
	Mn %	69	55	44	56
AC	I	73	59	40	57
	II	70	59	43	57
	III	69	59	39	56
	Mn %	71	59	41	57
SCB	I	82	63	55	67
	II	79	61	54	65
	III	79	61	50	63
	Mn %	80	62	53	65

Table 16 shows the percentage of hit accuracy for students predicted to have a C GPA or better (and who actually did) for first-year grades. The F in this case was 68.69, which is highly significant at the .001 level of probability. Therefore, the degree of confidence counselors had in these predictions was closely related to actual percentage accuracy.

This was not the case, however, when students were predicted by counselors to earn less than a C average for first-year grades. The percentage of hits for these predictions for the three degrees of confidence are shown

in Table 17, and it can be seen that there was considerable similarity among these percentages. The obtained F of 2.35 was not significant at the .05 level.

Table 17

Per Cent Hits for Most, Moderate, and Least Confident Predictions of "Less than C" Average for First-year Grades

Condition	Degree of Confidence			Mn %
	Most	Moderate	Least	
HS				
I	75	77	79	77
II	76	79	77	77
III	73	79	84	79
Mn %	75	78	80	78
AC				
I	78	76	80	78
II	79	75	82	79
III	74	72	73	73
Mn %	77	74	78	76
SCB				
I	69	69	84	74
II	70	79	79	76
III	73	78	84	78
Mn %	71	75	81	76

For the hit accuracies for first-year grades, then, the degree of confidence counselors had in all of their predictions ("C or better" and "less than C" predictions combined) was appropriately related to the accuracy of the predictions. That is, they were more accurate for the predictions in which they had most confidence and least accurate for predictions in which they had least confidence. The same relationship was found for those predictions in which students were predicted to earn a "C or better" GPA for first-year grades, but the degree of confidence counselors had in their predictions of less than a C GPA was not related to a differential in accuracy. Several factors are important in attempting to interpret these findings.

One is that counselors tend to have moderate confidence in the majority of their predictions of first-year achievement. HS counselors indicated a moderate degree of confidence in 57 per cent of their predictions, and were most confident in about 28 per cent and least confident in about 15 per cent. AC counselors were most, moderate, and least confident in 20 per cent, 67 per cent, and 13 per cent, respectively, of their predictions; while the three degrees of confidence for the SCB counselors were distributed into 12, 58, and 30 percentages, respectively. Perhaps because of somewhat more awareness of the difficulty of the task, SCB counselors were least confident in a larger per cent of their predictions than either of the other counselor groups.

Although these data provide information about the distributions of most, moderate, and least confidence predictions for the counselor groups, the question of why degree of counselor confidence was related to predictions of "C or better" but not to predictions of "less than C" is unanswered. Any attempt to answer this question must take cognizance of the fact that predictions for students to obtain "less than a C" average were consistently more accurate than the predictions of "C or better" (Tables 15 and 17). That is, although degree of confidence was not related to the "less than C" predictions, the percentage accuracy for these predictions was consistently higher than the accuracy for predictions of "C or better". For example, the mean percentage accuracies for all conditions for the HS, AC, and SCB counselor groups for the "less than C" predictions were 78, 76, and 76 (Table 17), respectively, with the mean percentage accuracies for the "C or better" predictions being 56, 57, and 65 (Table 15), respectively.

The superiority of the "less than C" predictions over the "C or better" predictions seems justifiable when several factors are considered. One important factor is that of the 100 male freshman students for whom predictions were made, 43 had "C or better" GPA's for first-year grades and 57 had "below C" averages. Although the majority had "less than C" averages, the counselors in each of the groups predicted that the majority of students would have passing grade averages. HS counselors predicted that, on the average for the three conditions, about 59 per cent would have "C or better" grade averages and 41 per cent would have "less than C" GPA's. Both the AC and SCB counselors predicted first-year grades of "C or better" for about 55 per cent of their cases. These figures suggest that counselors in all three groups did not tend to predict "less than C" grades unless the available evidence was pretty convincing that the given student would not earn passing marks. Combining this hesitancy to predict "less than C" grades with the fact that 57 of the 100 actually obtained "less than C" averages resulted in a higher percentage of these predictions being correct. And, of course, the same reasoning accounts for the poorer accuracy for the "C or better" predictions.

Perhaps this reasoning also accounts at least partially for the lack of relationship existing between degree of confidence and percentage accuracies for the "less than C" predictions. (Although it should be noted that the SCB counselors tended to have higher percentage accuracies for the predictions in which they had least confidence (Table 17).) Counselor predictions of GPA's were so out of proportion with the base rates that the probability of accuracy for all of the "less than C" predictions was increased considerably. Perhaps this cancelled out some of the effect of counselor confidence in predictions.

Another factor influencing the lack of relationship between degree of confidence and predictions of "less than C" might be that most counselors do not typically think in negative terms of predicting "lack of success" for students they work with. Because of general uncertainty in the counselor's mind (and perhaps some uneasiness as well) about this "lack of success" construct, maybe his predictions of this type lack consistency in terms of his degree of confidence estimations and are less meaningful. Maybe he has not focused enough attention on such predictions to be very clear himself what he means by being "more" or "less" confident in a particular judgment. But, at the same time, maybe he is better at predicting nonsuccess than he thinks.

The relationship between degree of confidence and predictive accuracy was also studied for over-all college grade predictions. Table 18 gives the percentage accuracies for each of the counselor groups for all over-all predictions of "pass" or "fail" in which counselors were most, moderate, and least confident. A simple analysis of variance computed on these data produced an F-ratio (44.87) that was significant at the .001 level, indicating that counselors' degree of confidence in their predictions was significantly related to accuracy. The greatest percentage accuracy occurred with predictions in which counselors were most confident, and the poorest accuracy was with predictions in which counselors expressed least confidence.

Table 18

Per Cent Hits for Most, Moderate, and Least Confident
Predictions of Over-all College Grades
Made by Counselor Groups for Each Condition

		<u>Degree of Confidence</u>			
<u>Condition</u>		<u>Most</u>	<u>Moderate</u>	<u>Least</u>	<u>Mn %</u>
HS	I	69	60	46	58
	II	71	61	45	59
	III	71	62	50	61
	Mn %	70	61	47	59
AC	I	68	63	49	60
	II	71	63	55	63
	III	66	64	50	60
	Mn %	68	63	51	61
SCB	I	73	58	59	63
	II	70	61	62	64
	III	74	62	58	65
	Mn %	72	60	60	64

For the over-all grade predictions in which students were predicted to earn a "C or better" average, an analysis of variance test found that counselor degree of confidence in predictions was significantly related to percentage accuracy at the .001 level of probability ($F = 53.07$). These percentages are listed in Table 19. Thus, as was the case with the first-year grade predictions, counselors seemed to have good insight as to the probability of accuracy of their over-all predictions of college achievement.

Table 19

Per Cent Hits for Most, Moderate, and Least Confident Predictions of "C or Better" Average for Over-all College Grades

Condition	Degree of Confidence			Mn %
	Most	Moderate	Least	
HS				
I	78	59	35	57
II	81	61	30	57
III	70	55	34	53
Mn %	76	58	33	56
AC				
I	77	66	32	58
II	81	68	47	65
III	68	55	44	56
Mn %	75	63	41	60
SCB				
I	89	58	53	67
II	83	60	59	67
III	78	52	44	58
Mn %	83	57	52	63

As also was the case with the first-year predictions, counselors' degree of confidence in over-all predictions of "less than C" were not significantly related to predictive accuracy ($F = <1$). The percentage accuracies for these predictions are listed in Table 20.

Table 20

Per Cent Hits for Most, Moderate, and Least Confident Predictions of "Less than C" Average for Over-all College Grades

Condition	Degree of Confidence			Mn %
	Most	Moderate	Least	
HS				
I	59	60	57	59
II	59	61	60	60
III	72	68	65	68
Mn %	63	63	61	62
AC				
I	59	59	66	61
II	60	58	63	60
III	64	72	55	63
Mn %	61	63	61	61
SCB				
I	56	57	65	59
II	57	61	65	61
III	69	72	72	71
Mn %	61	63	67	64

One important difference, however, between the first-year and over-all predictions was that over-all predictions of "less than C" were not more accurate for the counselor groups than were their predictions of "C or better" averages. Previous results showed that although degree of confidence was not related to percentage accuracies for the "less than C" predictions of first-year averages, the "less than C" predictions tended to be more accurate than the predictions of "C or better" averages.

A partial explanation again seems to be in connection with the base rates. Whereas the base rates for the first-year grade dichotomy of pass-fail was 43-57, the pass-fail dichotomy for over-all grade averages was 47-53. The difference in the first case was 14, but the difference in the second was only 6. Although counselors composing the three groups predicted that a greater percentage of students would have a "C or better" over-all

average than students with a "less than C" average (as they also did with the first-year predictions), part of the advantage favoring the "less than C" first-year predictions was lost with the over-all predictions. This was because fewer students failed and, therefore, the chances of being wrong on the "less than C" predictions increased.

The lack of relationship between degree of confidence and prediction of over-all grade averages of "less than C" seems to reflect directly upon counselors' uncertainty and confusion about the construct they were trying to predict. These results seem to suggest that counselors simply don't know how to label such a prediction in terms of how confident they are.

II - Individual Counselors

The second assessment of confidence in relation to predictive accuracy was made using the average degree of confidence that individual counselors had in their predictions. The mean for each counselor was determined from the average degree of confidence placed on the 300 cases for which predictions were made (100 in each condition). Some counselors tended to be consistently more confident in their judgments than other counselors, whereas some counselors were consistently less confident than other counselors.

In connection with individual counselor confidence in predictions, it is relevant that counselors tended to place essentially the same degree of confidence in "pass-fail" predictions (used in determining hits) as they did in predicting grade-point averages on a continuum. That is, for example, when counselors were asked to make a prediction of graduation versus

non-graduation for each student and to predict the over-all GPA on a continuum, the degree of counselor confidence tended to be very similar for both predictions. This made it possible, therefore, to use the same confidence mean for each counselor in assessing degree of confidence in relation to predictive efficiency for both hits and correlation coefficients.

In studying degree of confidence in relation to predictions of first-year grades, individual counselors were classified into "most", "moderate", and "least" confident groups on the basis of the average degree of confidence placed on their predictions. Seventeen counselors were placed in the "most confident" group (with means below 4.0 on the nine-point confidence scale), 42 were classified in the "moderate" group (with means between 4.0 and 6.0), and 7 in the "least confident" group (with means above 6.0). The mean number of first-year grade hits for each of these confidence groups for each condition is listed in Table 21.

Table 21

Summary Data for Hits for the Confidence Groups
in Predicting First-Year GPA

Confidence Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
Most	64.9	8.2	65.0	8.6	65.1	7.0	65.0	8.0
Moderate	69.0	6.2	69.0	6.6	67.9	8.8	68.6	7.3
Least	68.7	5.0	68.9	7.4	71.7	6.0	69.8	6.3
Total	67.9	6.9	67.9	7.5	67.6	8.3		

An analysis of variance was computed on these data and the results are presented in Table 22. The F-ratio for the confidence groups was significant at the .05 level of probability, suggesting that the differences among means were not due to chance factors. It is most interesting to observe from these results that counselors who typically lacked confidence in their first-year achievement predictions were more accurate, on the average, than the counselors who typically expressed most confidence in their predictions.

Table 22

Analysis of Variance Results for the Confidence Groups
for Number of Hits Predicted for First-year GPA

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Groups	37.43	2	18.72	4.35	.05
Conditions	.86	2	.43	<1	
Interaction	5.67	4	1.42	<1	
Error		189	4.30		

These results do not contradict the earlier results found where the percentage accuracies for all predictions of most, moderate, and least confidence for the HS, AC, and SCB counselors were appropriately related to degree of confidence (Table 15). Whereas in that assessment all predictions were pooled for the counselor groups on the basis of degree of confidence, the latter assessment selected out individual counselors who were typically "most", "moderate", and "least" confident in their predictions. The individual counselors composing the "most" and "least" confident groups were only a small proportion (about 36 per cent) of the total group of 66 counselors.

Table 22 also indicated that the F for conditions did not approach statistical significance at the .05 level.

These same confidence groups were also investigated in terms of predictive efficiency for r's between predicted and actual first-year GPA's, and the mean r's for each group are presented in Table 23. The mean r's for the "most", "moderate", and "least" confident groups were .57, .59, and .60, respectively, indicating that there was very little difference between the means for any two of the groups.

Table 23

Mean Correlation Coefficients Between Predicted and Actual
First-year GPA's for the Confidence Groups

Confidence Groups	Conditions			Total Mean
	I	II	III	
Most	.59	.57	.56	.57
Moderate	.59	.59	.59	.59
Least	.60	.63	.57	.60

Although the average degree of confidence that counselors had in their first-year predictions was very similar to the average amount of confidence expressed in predictions of over-all college grade averages, counselors were classified again into "most", "moderate", and "least" confidence groups on the basis of mean degree of confidence in over-all grades. Because predicting first-year scholastic performance is obviously not the same as predicting over-all grades, it was believed that a finer assessment could be made of the relationship between degree of counselor confidence and predictive accuracy if the first-year and over-all predictions were investigated separately. Therefore, a reclassification of the confidence groups found that thirteen counselors were placed in the "most"

confident group (having means below 4.0 on the nine-point confidence scale) and five counselors were placed in the "least" confident group (having means above 6.0). The remainder of the counselors ($N = 48$) composed the "moderate" confidence group. However, it is noteworthy that nine of the thirteen placed in the "most" confident group for over-all grades were likewise in the "most" confident group for first-year grade predictions; and four of the five counselors in the "least" confident group for over-all GPA predictions were also in the same group for first-year predictions.

Summary data for these confidence groups in predicting over-all hits are presented in Table 24. The analysis of variance results are given in Table 25. The F-ratio for the confidence groups was not statistically significant at the .05 level of probability, and inspection of the total means for the confidence groups in Table 24 points out that there was very little difference in the mean number of hits for these groups.

Table 24

Summary Data for Hits for the Confidence Groups
in Predicting Over-all College GPA

Confidence Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
Most	58.5	5.4	61.5	5.9	59.7	4.8	59.9	5.5
Moderate	59.9	5.6	60.5	5.6	61.8	5.4	60.7	5.4
Least	60.0	5.3	61.4	6.6	60.0	8.9	60.5	7.1
Total	59.7	5.5	60.8	5.7	61.3	5.7		

Table 25

Analysis of Variance Results for Confidence Groups
for Number of Hits Predicted for Over-all College GPA

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>
Groups	1.03	2	.52	<1
Conditions	4.17	2	2.09	<1
Interaction	3.60	4	.90	<1
Error		189	2.51	

The mean r's between predicted and earned over-all GPA's for the confidence groups are listed in Table 26. As has been the case with every analysis of the r's, very little difference was found among the confidence groups on the basis of size of r's.

Table 26

Mean Correlation Coefficients Between Predicted and Actual
Over-all College GPA's for the Confidence Groups

<u>Confidence Groups</u>	<u>Conditions</u>			<u>Total Mean</u>
	<u>I</u>	<u>II</u>	<u>III</u>	
Most	.51	.51	.51	.51
Moderate	.51	.51	.51	.51
Least	.51	.53	.45	.50

Taken together, these results suggest that there is some evidence that counselors who are typically most confident about the accuracy of their predictions actually are less accurate than counselors who express least confidence about the correctness of their judgements. Whereas the analysis of first-year predictions gave results in this direction, the findings for the over-all college hit predictions did not show this. However, even the results

in the latter case are important in showing that counselors who feel most confident about their predictions are not more accurate than counselors typically least confident. It may be hypothesized that counselor expressions of confidence are more reflections of personalities than anything else. However, if there is a relationship in terms of predictive accuracy, these results suggest that it is in the reverse order.

It is also of interest to point out that of the 17 counselors typically most confident about their first-year predictions, 15 were HS counselors and two were AC counselors. Although the SCB counselors were on the average more accurate than HS or AC counselors, no SCB counselor tended to be very confident about his judgments. Of the seven counselors typically least confident, four were HS counselors, one was an AC counselor, and two were SCB counselors. Of the 13 counselors typically most confident about their overall GPA predictions, seven were HS counselors, and four and two, respectively, were AC and SCB counselors. Of those five typically least confident, two were HS counselors, two were AC counselors, and one was from the SCB group.

Counselor Self-Ratings in Relation to Predictive Accuracy

Each counselor who participated in this investigation was asked on a questionnaire to rate himself on general counseling effectiveness when compared with other counselors he knew with similar responsibilities. In making this self-rating, five alternatives were available: (1) one of the most effective, (2) more effective than most, (3) about average in effectiveness, (4) not as effective as most, (5) one of the least effective. Five counselors rated themselves in the top category, 21 rated themselves in the second, 35 in the third, and 1 each in the fourth and fifth categories.

Three counselors did not respond to this question.

However, in making the assessment of self-ratings in relation to predictive accuracy, only two groups were used. Those counselors who rated themselves better than average (groups 1 and 2) were combined to make a single group, and counselors who evaluated themselves average or below (groups 3, 4, and 5) were combined into a single group. (The two counselors who rated themselves less effective than average did so primarily because of lack of counseling experience, and because of this there was justification for including them with the "average" group.) The "above average" group included 26 counselors and the "average" group had 37 counselors.

For predictions of first-year grades, the mean number of hits for the self-rating groups for each condition are listed in Table 27. The analysis of variance results are presented in Table 28, and it can be seen that the F of 7.49 was significant at the .01 level.

Inspection of the means for the self-evaluation groups (Table 27) indicates that counselors who rated themselves "average" obtained a larger mean number of hits (69.0) for first-year GPA predictions than did the "above average" group (mean of 65.9). Thus, when considering these results in conjunction with the findings for counselors who were most and least confident about their predictions, the evidence suggests that counselors who rated themselves highly or who felt quite confident about their predictions actually did a poorer job of predicting first-year hits than those counselors who rated themselves as only average or were least confident about their predictions.

Table 27

Summary Data for Number of Hits for the Self-Rating Groups
in Predicting First-year GPA

Self-Rating Groups	Conditions						Total	
	I		II		III			
	Mn	SD	Mn	SD	Mn	SD	Mn	SD
Above average	65.5	7.75	65.1	8.3	67.2	7.7	65.9	7.5
Average	69.6	5.9	69.6	6.2	67.9	8.9	69.0	7.2
Total	67.9	7.0	67.7	7.5	67.6	8.4		

Table 28

Analysis of Variance Results for the Self-Rating Groups
for Number of Hits Predicted for First-year GPA

Source of Variation	Sum of Squares	d.f.	Mean Square	F	P
Groups	14.23	1	14.23	7.49	.01
Conditions	.07	2	.04	< 1	
Interaction	4.51	2	2.26	1.19	
Error		183	1.90		

It should be understood, however, that no attempt is being made here to suggest that counseling effectiveness is synonymous with ability to accurately predict scholastic achievement. Obviously, many factors (and who knows what all these factors are?) are associated with counselor effectiveness. But if predicting achievement is unrelated to effectiveness as a counselor, no significant difference should have been found in any direction. That is, these results indicate that counselors who rated themselves "better than average" were not better than the "average" counselors in making these predictions and, in fact, they didn't even do as well. Thus, a relationship of some type seems to exist.

Several interpretations are possible. One of these is that counselors who rate themselves high are, in fact, more generally effective than those who rate themselves as about average, and, further, general effectiveness is negatively related with clinical predictions of academic achievement. Another interpretation might be that counselor self-evaluations reflect personality characteristics of the counselors themselves, and a self-rating is essentially a reflection of one's self image. Therefore, counselors who are willing to rate themselves highly may tend to be actually less effective than counselors who rate themselves as average. This interpretation would assume that counselor effectiveness and accuracy in making predictions are positively related. Still another interpretation might be that self-ratings do reflect one's self image, but predictive accuracy is unrelated to actual effectiveness as a counselor. Thus the significant relationship found between predictive accuracy and self-ratings would have to be accounted for on some other basis.

Although these and other interpretations are possible, the right interpretation of these data eludes us because there is no way to determine actual counselor effectiveness. However, it can be concluded that counselors who rate themselves highly are less efficient, on the average, at making predictions of first-year achievement than counselors who rate themselves as average.

Self-evaluation and predictive efficiency of first-year GPA's was also assessed using the correlation coefficients. These data are listed in Table 29. As has been found in every case where correlations were studied, the r 's for the self-rating groups were very similar. The total mean r for the "above average" group was .58 and the mean r for the "average" group was .59.

Table 29

Mean Correlation Coefficients Between Predicted and Actual
First-year and Over-all College GPA's
for the Self-Rating Groups

Self-Rating Groups	Conditions						Total Means	
	I		II		III			
	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
Above average	.59	.52	.59	.52	.57	.49	.58	.51
Average	.59	.50	.59	.51	.58	.49	.59	.50

1 = first-year GPA r's

2 = over-all college GPA r's

The relationship between counselor self-ratings and predictive efficiency was investigated for hits for over-all college grades. Summary data for these groups are presented in Table 30.

Table 30

Summary Data for Number of Hits for Self-Rating Groups
in Predicting Over-all College GPA

Self-Rating Groups	Conditions							
	I		II		III		Total	
	Mn	SD	Mn	SD	Mn	SD	Mn	SD
Above average	58.8	5.4	60.2	5.5	61.5	5.6	60.2	5.6
Average	61.0	5.0	61.5	5.6	61.5	5.8	61.3	5.5
Total	60.1	5.3	61.0	5.6	61.5	5.7		

Analysis of variance results are given in Table 31, where it can be seen that the F-ratio for the self-rating groups was not significant at the .05 level of probability. The total means (Table 30) for the two groups were very similar, with the mean for the "above average" group being 60.2 and the mean for the "average" group being 61.3. Therefore, these findings are not consistent with the results found for the hits for first-year

predictions, where the "average" group predicted with greater accuracy than the "above average" group. However, perhaps the reason for these results becomes clearer when the counselors composing these two self-rating groups are taken into consideration. Forty of the 66 counselors are from high schools and this group did poorer, on the average, than either the AC or SCB groups in predicting over-all college achievement. Having had little practice at making global predictions of over-all college achievement, the HS group probably was not very clear about the construct being predicted. In any case, when about 60 per cent of the total group (40 of 66) is classified on self-ratings, the net effect is that no differences between groups shows up for this prediction.

Table 31

Analysis of Variance Results for Self-Rating Groups
for Number of Hits Predicted for Over-all College GPA

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>
Groups	2.07	1	2.07	2.03
Conditions	2.60	2	1.30	1.27
Interaction	1.39	2	.70	< 1
Error		183	1.02	

The mean correlation coefficients between predicted and actual over-all GPA's for the self-rating groups are shown in Table 29. For the "above average" group, the mean r for the three conditions was .51, and the mean for the "average" group was .50. Obviously, the difference between these r 's is not statistically significant.

b

Counselor Consistency in the Use of Case Information
in Relation to Accuracy of Predictions

An analysis of the consistency (or inconsistency) with which counselors used information available to them in making predictions was conducted to determine what effect, if any, this has upon predictive accuracy. Some counselors tended to consistently use only a small number of variables from the total number available from which they could choose, whereas other counselors seemed to vary widely in their selection of the case material in making predictions.

Actually, counselor consistency in use of data conveys considerable information about the procedure and manner in which such a task is undertaken. The choice of the same two or three variables in making every prediction, and in essentially the same proportion in terms of estimated weight placed on these data, implies that the task is being approached in much the same manner as predictions are made from a regression equation. The only difference seems to be that the "regression equation" is in the counselor's head. On the other hand, using different variables from case to case suggests that the counselor is not handling each case routinely (as with the application of a regression equation), but is attempting to approach each case separately. This implies that the counselor is trying to build a "person" for each case, and from this construct his predictions are made. Therefore, the assessment of the relationship between counselor consistency in the use of case material was an attempt to determine whether the implicit procedure used by counselors in prediction-making is associated with predictive accuracy.

In determining counselor consistency the following procedure was used. Counselor answer sheets for each of the 100 cases in condition III

were used because complete information was supplied to counselors for predictions made under that condition. The aim was to find out how counselors normally go about using case data, or how data would be used if a great deal of it were available. The variables used and the estimated weights of importance placed on these variables were charted for each counselor from his answer sheets. It was then possible to place each counselor in one of the following four categories on the basis of consistency in the use of data: (In making predictions, it was assumed that 100 per cent of "something" went into each prediction.)

- (1) At least 90 per cent of the estimated weight consistently placed on the same variables, and in the same proportion.
- (2) At least 70 per cent of the estimated weight consistently placed on the same variables, but variability in the proportions.
- (3) At least 50 per cent of the estimated weight consistently placed on the same variables, with no concern about variability in proportions.
- (4) Less than 50 per cent of the estimated weight consistently placed on the same variables.

After charting each counselor's responses, 17 were placed in the first classification, 27 in the second, and 11 each in the third and fourth categories. The first classification included counselors who seemed to be using an implicit "regression equation" in that the same variables (usually HSR and MSAT) were used in the same way. The second classification seemed to include counselors who thought in terms of a "regression equation" but were willing to take other factors into account to "beat the equation". Counselors in the third and fourth classifications seemed to approach each case separately and to make predictions for that individual. There seemed

to be an effort to build a construct for each case. Of importance, also, is that counselors used data in much the same way in predicting both first-year and over-all college grades. Therefore, it was possible to use the same classifications of counselors in assessing the relationship between consistency and accuracy in predicting both first-year and over-all grades.

Summary results for the four consistency groups in predicting hits for first-year predictions are presented in Table 32. The analysis of variance results for these data, shown in Table 33, indicates that the differences among the mean hits for the consistency groups was not statistically significant at the .05 level of probability. These results suggest, then, that the procedure or manner in which a counselor goes about making first-year predictions does not seem to be related to predictive efficiency. That is, whether a counselor uses an implicit "regression equation" or tries to build a construct for each case does not seem to be in itself a crucial factor in making accurate predictions.

Table 32

Summary Data for Number of Hits for the "Consistency" Groups*
in Predicting First-year GPA

Consistency Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
I	68.7	7.0	67.9	6.3	67.4	6.9	68.0	6.8
II	69.6	5.8	68.1	8.4	69.3	7.4	69.0	7.3
III	63.9	9.0	68.2	8.1	64.2	11.3	65.4	9.7
IV	64.6	4.3	67.3	5.7	67.1	7.5	66.9	6.0
Total	67.9	6.9	67.9	7.5	67.6	8.3		

* "Consistency" groups defined above.

Table 33

Analysis of Variance Results for the "Consistency" Groups
Number of Hits Predicted for First-year GPA

Source of Variation	Sum of Squares	d.f.	Mean Square	F
Groups	22.36	3	7.46	1.86
Conditions	3.01	2	1.51	< 1
Interaction	16.55	6	2.76	< 1
Error		186	4.01	

The mean correlation coefficients between predicted and actual first-year grades for these consistency groups are listed in Table 34. It can be seen from this table that there was very little differentiation among these groups on size of r's.

Table 34

Mean Correlation Coefficients Between Predicted and Actual First-year
and Over-all College GPA's for the "Consistency" Groups

Consistency Groups	Conditions						Total Means	
	I		II		III			
	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
I	.59	.50	.58	.52	.57	.49	.58	.50
II	.60	.52	.61	.52	.60	.53	.60	.52
III	.58	.49	.58	.47	.55	.47	.57	.48
IV	.57	.50	.59	.51	.57	.46	.58	.59

1 = First-year GPA r's
2 = Over-all college GPA r's

A comparison of these consistency groups was also made on the mean number of hits made by each group in predicting over-all college grades. The means and standard deviations for these groups are shown in Table 35, and the analysis of variance results given in Table 36.

Table 35

Summary Data for Number of Hits for the "Consistency" Groups*
in Predicting Over-all College GPA

Consistency Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
1	60.1	7.1	61.4	5.6	60.5	6.0	60.6	6.3
2	60.0	5.3	61.2	5.0	63.7	4.0	61.7	5.0
3	59.4	4.4	61.3	6.0	59.0	6.9	59.9	5.9
4	58.4	3.9	58.2	6.6	58.6	4.9	58.4	6.5
Total	59.7	5.5	60.8	5.7	61.3	5.7		

* "Consistency" groups defined above

The obtained F of 2.60 for the consistency groups was not significant at the .05 level, suggesting that the approach taken by counselors in combining data to make predictions of over-all scholastic achievement is not related to predictive accuracy. The F-ratio for testing the differences among means for the three conditions was also not significant.

Table 36

Analysis of Variance Results for the "Consistency" Groups
for Number of Hits Predicted for First-year GPA

Source of Variation	Sum of Squares	d.f.	Mean Square	F
Groups	17.08	3	5.69	2.60
Conditions	2.77	2	1.39	< 1
Interaction	8.16	6	1.36	< 1
Error		186	2.19	

The mean correlations between predicted and obtained over-all GPA's for the consistency groups, listed in Table 34, reveal that there was little difference between the total r 's for any two of these groups.

Taken together, these results do not produce any evidence suggesting that the methods typically used by counselors in combining data to make predictions of academic achievement are related to predictive accuracy. Whether a counselor consistently uses only two variables in making predictions from a "regression equation" or builds an elaborate hypothetical construct does not appear to be in itself of primary significance in relation to predictive accuracy. In other words, just because a counselor claims to use a "regression equation" does not automatically mean that he is better or worse at making predictions than anyone else.

Such a conclusion, however, seems to be very much in need of qualification. Previous results showed that the SCB counselors as a group were superior to any of the other groups on the mean number of hits obtained for both first-year and over-all GPA predictions (Tables 1 and 4). Yet, every one of these 12 SCB counselors was classified in either consistency group 1 or 2 (five in group 1 and seven in group 2), suggesting that some form of an equation was used by every counselor. Thus, when considered in this light the conclusion that predictive accuracy is not related to the manner in which data are used must be altered.

A more accurate conclusion would be, logically enough, that predictive accuracy cannot be separated from knowledge of what is being predicted. SCB counselors demonstrated that, on the average, they were more effective at making predictions than the other counselor groups, and by so doing revealed a more thorough understanding of the criterion being predicted.

Thus, the SCB counselors were more familiar with factors related to the construct of academic achievement and because of this were able to use an implicit "regression equation" more efficiently. Therefore, some HS counselors might indicate that they use some form of a "regression equation" in making predictions, but because they are not too familiar with the construct being predicted they do not predict more accurately than other HS counselors who apparently don't use an "equation" but who are likewise not very knowledgeable about what is being predicted. Considered in this light, then, it becomes clear why the use of an "equation" is not in itself enough to make predictions more accurate. But greater knowledge about the criterion seems to result in the use of some form of an "equation".

More will be said about this in a later section comparing the most and least accurate counselors at making predictions.

Estimated Weights Placed Upon Variables in Making Predictions of Academic Achievement

In making predictions of achievement for freshmen males in SLA, counselors were asked to indicate the variables they used in arriving at each prediction by estimating the approximate relative importance or weight placed upon each variable used. In doing this, counselors were asked to assume that 100 per cent of "something" went into each prediction, and their job was to indicate as best they could which variables were used in making each prediction. No doubt this is only a very rough estimation, but at least two kinds of information are learned. One is that through this procedure counselors reveal which variables they are paying most attention to and roughly in what order of importance. Another is that some information is learned about the consistency with which counselors use data, which

reveals something about the implicit manner in which counselors go about making predictions. That is, a counselor might use an implicit or explicit regression equation in making every prediction or, on the other hand, each case might be dealt with separately by attempting to build an hypothetical construct from which predictions can then be made. This section will discuss the first kind of information gained, leaving the other for discussion in another section.

This section attempted to determine whether counselors who worked in different settings used similar case information (variables) in making predictions. Comparisons were made among counselors who work in high schools, in the Arts College (University of Minnesota), and the Student Counseling Bureau of the University of Minnesota. In addition, a fourth group composed of non-counselors was included to allow for comparisons to be made among counselors and non-counselors on the variables used in making predictions of academic achievement.

Summary data for these groups are listed in Table 37. This provides information about the average amount of weight or importance placed upon each variable by each group. It is particularly interesting to observe the change (or lack of change) in the weight placed upon the variables from condition to condition as more types of information were made available. It can be seen that in spite of the many types of data available, the three groups of counselors were consistent in placing heavy emphasis upon HSR and MSAT. Judging from the total means for all three conditions, these counselor groups averaged placing about 58 to 66 per cent of the weight on these two variables. The non-counselor group, on the other hand, estimated that considerably less value was given to these same variables. (The multiple correlation between these two variables and the criterion of first-year grades was .65.)

Table 37

Summary Data* for Each Condition for Estimated Weights Placed Upon Variables
by Each Counselor Group in Making Predictions of First-year GPA's

Variables		HS Counselors				AC Counselors				SCB Counselors				Non-Counselors			
		Conditions				Conditions				Conditions				Conditions			
		I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.
HSR	Mn	36.1	33.4	27.9	32.5	31.7	30.7	30.3	30.9	42.8	41.0	34.0	39.3	16.9	18.0	21.2	18.7
	SD	18.7	15.8	21.2	16.3	14.0	13.8	12.8	13.6	16.9	20.4	22.1	20.3	15.9	17.2	19.5	17.7
MSAT	Mn	30.4	30.9	25.9	29.1	29.0	27.5	24.4	27.0	28.9	27.1	22.7	26.2	26.8	36.1	23.8	28.9
	SD	14.3	12.4	11.1	12.9	10.9	10.9	9.1	10.5	11.7	13.2	14.1	13.3	17.1	20.9	17.9	19.4
CET	Mn	16.7	16.4	13.4	15.5	16.0	13.4	11.3	13.5	10.9	7.9	5.9	8.3	21.5	15.8	16.5	17.9
	SD	12.7	11.5	10.4	11.7	9.7	8.5	7.8	9.9	10.6	7.9	6.3	8.7	17.3	17.0	20.2	25.4
HS Math Grade	Mn	5.6	4.9	3.4	4.6	5.8	6.0	5.3	5.7	3.8	2.7	2.6	3.0	7.1	4.6	4.3	5.3
	SD	7.4	6.7	5.5	6.6	6.0	5.4	5.4	5.7	5.7	4.5	4.5	5.0	9.5	6.9	7.6	8.2
HS Eng. Grade	Mn	6.0	4.7	3.5	4.7	5.2	5.2	4.8	5.1	3.7	2.4	2.5	2.9	7.8	5.5	4.4	5.9
	SD	7.8	6.3	5.4	6.7	5.7	5.1	5.5	5.5	5.7	4.3	4.4	4.5	9.6	7.9	9.5	9.2
HS SS Grade	Mn	4.1	3.7	2.7	3.5	5.1	5.3	4.8	5.1	3.4	2.4	2.6	2.8	7.1	4.6	2.7	4.8
	SD	5.9	5.5	4.6	5.4	5.7	5.2	5.5	5.5	5.5	4.3	4.5	4.8	11.3	6.8	6.2	8.6
HS NS Grade	Mn	4.0	3.8	2.7	3.5	4.9	5.5	4.8	5.1	3.5	2.4	2.6	2.8	6.4	4.2	3.0	4.5
	SD	4.2	5.7	4.6	5.5	5.6	5.4	5.5	5.5	5.4	4.4	4.5	4.8	9.2	6.6	6.2	7.6
STEP SS	Mn	3.3	3.3	2.4	3.0	7.8	6.3	5.3	6.4	6.8	5.8	5.0	5.9	9.5	6.9	5.3	7.2
	SD	5.9	6.1	4.5	5.6	9.5	8.6	8.3	8.9	7.3	6.4	6.1	6.7	12.4	11.3	9.9	11.4
SVIB	Mn	-	3.3	1.8	2.5	-	5.1	4.0	4.6	-	2.4	1.9	2.2	-	5.4	1.9	3.7
	SD	-	6.2	4.2	5.3	-	7.7	6.9	7.3	-	5.4	4.2	4.8	-	11.1	5.6	8.9
MMPI	Mn	-	2.7	1.4	2.1	-	3.8	2.9	3.3	-	3.9	2.9	3.4	-	.2	.3	.2
	SD	-	6.4	4.6	5.6	-	7.0	6.7	6.9	-	7.3	5.7	6.6	-	1.7	2.0	1.9
Biog. Info.	Mn	-	-	11.4	11.4	-	-	8.3	8.3	-	-	5.5	5.5	-	-	5.0	5.0
	SD	-	-	11.0	11.0	-	-	8.8	8.8	-	-	7.9	7.9	-	-	12.4	12.4
Stat. Info.	Mn	-	-	10.0	10.0	-	-	5.3	5.3	-	-	18.9	18.9	-	-	3.1	3.1
	SD	-	-	11.8	11.8	-	-	7.8	7.8	-	-	29.2	29.2	-	-	14.8	14.8
Other	Mn	1.0	1.0	1.8	1.2	.1	1.6	3.2	1.6	1.0	1.0	1.1	1.0	4.9	3.6	1.0	3.2
	SD	4.9	3.9	4.8	4.6	1.0	6.9	8.4	6.4	3.4	3.0	3.4	3.3	13.4	14.4	5.7	11.9

* Blank spaces indicate that the particular variable was not available for that condition.

An analysis of variance was computed for each variable to test the differences in the mean weighting given by the counselor and non-counselor groups, and to test the differences in the mean amount of weight given from condition to condition. These results are listed in Table 38.

Table 38

F-Ratios* for Counselor Groups, Conditions, and Interaction Terms for the Variables Used in Making Predictions of First-year GPA

<u>Variables</u>	<u>Counselor Groups</u> <u>F-Ratio</u>	<u>Conditions</u> <u>F-Ratio</u>	<u>Interaction</u> <u>F-Ratio</u>
HSR	1297.12	77.35	61.29
MSAT	49.50	346.08	63.33
CET	575.80	236.48	14.89
HS Math Grade	162.69	107.69	18.07
HS Eng. Grade	177.50	133.79	17.86
HS SS Grade	230.00	92.73	40.45
HS NS Grade	145.24	104.76	30.48
STEP SS	284.17	146.11	15.00
SVIB	96.40	212.40	35.60
MMPI	234.74	58.42	8.95
Biog. Info.	186.16	--	--
Stat. Info.	258.84	--	--
Other	110.00	<1**	73.57

* All F's are significant at the .001 level except one

** Not significant at the .05 level

With one exception (the F for conditions for the "other" variable), all of the F-ratios listed in this table are highly significant, the primary reason being that in most cases a total of 24, 299 degrees of freedom were available. Thus, only a very small difference between means was sufficient to produce a very large F value. This is an example of the results that can be obtained statistically if the N's are large enough.

As indicated, the data provided in Table 37 are probably of most practical use in revealing how different groups of counselors use data depending upon the type of information available. Also, although the F's were highly significant, observation of the total means for all conditions indicates that the counselor groups (the NC group excluded) tended not to differ too much in the use of the data available.

The mean weights placed on these variables by the counselor and non-counselor groups in making predictions of over-all college grades are listed in Table 39, with the F values shown in Table 40.

Table 39

Summary Data* for Each Condition for Estimated Weights Placed Upon Variables by Each Group in Making Predictions of Over-all College GPA's

Variables		HS Counselors				AC Counselors				SCB Counselors				Non-Counselors			
		Conditions				Conditions				Conditions				Conditions			
		I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.
HSR	Mn	33.2	30.7	26.1	30.0	31.2	29.8	28.9	30.0	42.0	40.7	35.2	39.3	15.8	14.8	18.1	16.5
	SD	18.6	16.5	14.9	17.0	14.9	14.6	14.4	14.4	17.2	20.6	23.0	20.6	15.3	16.5	18.7	16.9
MSAT	Mn	30.6	30.4	25.9	29.0	29.6	28.9	25.7	28.1	29.4	26.9	22.9	26.4	26.9	35.7	22.6	28.9
	SD	14.6	13.2	12.4	13.6	11.6	10.9	10.4	11.1	12.3	13.3	14.6	13.7	19.5	21.8	18.2	20.5
CET	Mn	17.1	16.0	11.8	15.0	16.3	13.4	9.8	13.2	10.6	6.8	5.5	7.7	17.7	16.2	15.8	16.5
	SD	12.9	12.0	10.5	12.1	10.5	8.7	8.3	9.6	11.0	6.7	5.9	8.4	16.5	16.0	16.9	16.5
HS Math Grade	Mn	5.8	4.7	3.4	4.6	5.1	4.5	3.4	4.3	3.5	2.0	1.8	2.4	7.2	4.0	4.3	5.2
	SD	8.0	6.9	5.7	7.0	6.1	5.6	5.0	5.6	5.4	4.1	4.0	4.6	10.3	7.3	8.3	8.8
HS Eng. Grade	Mn	5.8	4.3	3.2	4.4	4.4	3.5	2.9	3.6	3.6	1.8	1.6	2.3	7.0	4.0	3.7	4.9
	SD	7.7	6.3	5.5	6.6	5.5	4.9	4.5	5.0	5.7	3.9	3.7	4.6	10.2	7.4	7.9	8.7
HS SS Grade	Mn	4.1	3.5	2.4	3.3	4.4	3.5	2.9	3.6	3.4	1.8	1.7	6.8	6.5	3.6	2.5	4.2
	SD	6.3	5.7	4.7	5.7	5.6	4.9	4.6	5.1	5.4	3.9	3.8	4.5	10.5	6.7	5.5	8.0
HS NS Grade	Mn	4.1	3.7	2.5	3.4	4.4	3.9	3.0	3.7	3.3	1.9	1.6	2.3	6.2	3.4	3.0	12.6
	SD	6.3	5.9	4.8	5.7	5.7	5.3	4.6	5.3	5.3	3.9	3.8	4.4	9.4	8.0	6.6	7.8
STEP SS	Mn	3.8	3.6	2.3	3.3	8.0	6.9	5.5	6.8	7.5	6.6	5.7	6.6	10.2	9.0	5.3	8.1
	SD	6.7	6.5	4.8	6.1	9.3	8.9	8.0	8.8	8.2	7.1	6.0	7.2	12.9	12.5	10.0	11.8
SVIB	Mn	-	4.9	2.7	3.8	-	7.3	6.2	6.8	-	3.8	2.6	3.2	-	8.5	3.1	5.8
	SD	-	7.9	5.6	7.0	-	9.5	8.9	9.2	-	6.9	5.0	6.1	-	14.8	8.6	12.4
MMPI	Mn	-	3.8	2.2	3.0	-	4.7	3.5	4.1	-	4.6	3.2	7.8	-	.2	.3	.3
	SD	-	8.0	6.4	7.3	-	7.7	6.7	7.3	-	8.1	5.7	7.1	-	2.5	2.3	2.4
Biog. Info.	Mn	-	-	15.2	15.2	-	-	10.8	10.8	-	-	6.3	6.3	-	-	6.5	6.5
	SD	-	-	13.4	13.4	-	-	10.0	10.0	-	-	9.4	9.4	-	-	13.8	13.8
Stat. Info.	Mn	-	-	8.4	8.4	-	-	4.7	4.7	-	-	16.6	16.3	-	-	4.1	4.1
	SD	-	-	11.3	11.3	-	-	7.1	7.1	-	-	26.8	26.8	-	-	16.3	16.3
Other	Mn	1.4	1.2	2.3	1.7	.1	1.4	3.7	1.7	1.3	.8	1.4	1.2	6.7	5.2	1.6	4.5
	SD	5.8	5.0	5.9	5.6	1.6	6.9	8.6	6.6	4.8	3.7	4.8	4.4	15.7	17.3	8.3	14.2

* Blank spaces indicate that the particular variable was not available for that condition.

Although, again, all of the F values were highly significant at the .001 level with one exception, most use of these results seems to come from an inspection of the mean weightings in Table 39. There appeared to be generally a good deal of agreement by the counselor groups in the use of these data, particularly when compared with the variables used by the NC group.

Table 40

F-Ratios* for Counselor Groups, Conditions, and Interaction Terms for the Variables Used in Making Predictions of Over-all College GPA's

<u>Variables</u>	<u>Counselor Groups</u> <u>F-Ratio</u>	<u>Conditions</u> <u>F-Ratio</u>	<u>Interaction</u> <u>F-Ratio</u>
HSR	1506.56	68.17	32.94
MSAT	27.62	330.38	61.62
CET	506.52	243.60	34.94
HS Math Grade	142.41	175.86	15.17
HS Eng. Grade	149.23	237.31	10.00
HS SS Grade	90.95	248.10	21.90
HS NS Grade	98.57	191.90	17.62
STEP SS	322.75	192.75	17.50
SVIB	152.78	334.72	56.39
MMPI	237.69	81.92	11.15
Biog. Info.	272.83	--	--
Stat. Info.	188.28	--	--
Other	180.77	1.41**	90.00

* All F's are significant at the .001 level except one

** Not significant at .05 level

High Accuracy Versus Low Accuracy Counselors in Predicting Academic Achievement

The results presented in a previous section of this chapter revealed that there were individual differences among counselors in their ability to predict academic achievement. Some counselors were simply better at making these predictions than other counselors. (The records for the individual counselors were listed in Table 8.)

The purpose of this phase of the study was to identify the most and least accurate counselors in making predictions and to compare them in three ways. First, these groups were compared on the average amount of weight they placed upon the information they had for making predictions. It was felt that if large enough practical differences were found on the way these counselors combined or assembled information in making predictions, there might be some possibility of using this knowledge for training purposes.

A second comparison was made between these groups on psychometric and biographic data obtained through several types of tests and from a questionnaire. (A copy of the questionnaire is included in the Appendix.) The test data collected for these counselors included the Miller Analogies Test (MAT), the Minnesota Multiphasic Personality Inventory (MMPI), the Edwards Personal Preference Schedule (EPPS), and the Strong Vocational Interest Blank (SVIB)--Male Form. This comparison would help determine whether there were characteristic differences between those who predicted best and those who predicted worst.

The third concern was to compare the high, average, and low accuracy groups on the reliability of their predictions of first-year and over-all college grade averages.

In identifying the most and least accurate counselors at prediction-making, it was desired to have a single rating of predictive accuracy rather than separate ratings for the several predictions made. Therefore, the number of hits and the size of the correlations coefficient between predicted and actual first-year grades as well as the hits and the correlation coefficient for over-all college grades for each counselor were all taken into account in determining this single rating of predictive accuracy. Thus, four different factors were used in making this single rating. The mean number of hits and r 's for both first-year and over-all college grade predictions are listed in the last four columns of Table 8.

The following procedure was used in arriving at this single rating for each counselor. The number of hits for the first-year and over-all grade predictions were combined (with equal weighting given to each) to yield a single score, and these scores were then ranked from 1 to 66. The same procedure was followed for the first-year and over-all college r 's, with these r 's combined (again with equal weighting) to produce scores which were ranked for the 66 counselors. Each counselor had two ranks, one for hits and one for r 's, which were then combined to yield a single predictive accuracy rating. With this procedure, the counselors who were consistently most accurate were rated best and those who were consistently least accurate were rated lowest. From this single rating the 12 counselors who rated highest were placed into the "high accuracy" group and the bottom 12 composed the "low accuracy" group. The other 42 counselors made up the "average accuracy" group.

Deciding upon the number of counselors to include in the "high accuracy" group was not entirely arbitrary. It was found that 12 counselors were able to predict with consistently greater accuracy than the non-counselor group average on either the r's or hit predictions, or for both the r's and the hits. Therefore, in using the single rating score to select the high and low accuracy groups, most of these same counselors were included. However, to some extent the number "12" was arbitrary.

Variables Used in Making Predictions

Table 41 provides summary data about how these three groups typically used information in making predictions of first-year GPA's.

Table 41

Mean Percentages for Estimated Weights Placed Upon Variables*
by the High, Average, and Low Accuracy Counselor Groups
in Predicting First-year Grades

Variables		High (N=12)				Average (N=42)				Low (N=12)			
		Conditions			Tot.	Conditions			Tot.	Conditions			Tot.
		I	II	III		I	II	III		I	II	III	
HSR	Mn	42.4	37.6	37.7	39.2	36.6	36.8	28.6	33.6	29.9	26.4	24.5	27.0
	SD	14.6	17.3	11.4	14.8	17.3	16.5	16.8	17.2	18.2	14.3	12.4	14.8
MSAT	Mn	28.9	26.8	26.9	27.5	30.2	30.6	24.9	28.6	29.6	28.1	23.3	27.0
	SD	11.5	13.4	9.4	11.6	13.3	12.2	12.3	12.9	14.2	11.4	9.6	12.2
CET	Mn	13.1	9.5	7.5	10.0	16.2	15.0	12.5	14.6	15.5	16.2	12.6	14.7
	SD	11.0	9.3	8.1	9.8	12.4	11.1	9.9	11.3	10.7	9.9	9.4	10.1
HS Math Grade	Mn	4.5	4.8	4.6	4.6	5.1	4.4	3.3	4.3	6.7	5.7	4.2	5.5
	SD	6.5	6.1	5.2	6.0	6.9	6.4	5.4	6.3	7.2	5.5	5.2	6.1
HS Eng. Grade	Mn	4.2	4.0	4.4	4.2	5.6	4.2	3.2	4.4	6.0	5.4	3.9	5.1
	SD	6.3	5.4	5.2	5.7	7.5	6.1	5.4	6.4	6.2	5.4	5.1	5.7
HS SS Grade	Mn	3.8	3.8	4.3	3.9	3.9	3.5	2.7	3.4	5.8	4.9	3.4	4.7
	SD	6.0	5.4	5.1	5.5	5.5	5.2	4.7	5.2	6.4	5.5	4.9	5.7
HS NS Grade	Mn	4.1	4.5	4.4	4.3	3.8	3.6	2.7	3.4	5.4	4.5	3.2	4.4
	SD	6.0	5.8	5.0	5.6	5.6	5.3	4.8	5.3	6.5	5.6	4.7	5.7
STEP SS	Mn	3.1	1.8	2.0	2.3	4.7	4.2	3.2	4.0	7.1	7.7	6.1	7.0
	SD	5.8	4.3	4.2	4.9	6.9	6.4	5.3	6.3	9.5	9.1	8.1	8.9
SVIB	Mn	-	2.8	.9	1.9	-	3.7	2.8	3.3	-	3.3	1.8	2.5
	SD	-	5.7	3.0	4.6	-	6.7	5.6	6.2	-	6.4	4.1	5.4
MMPI	Mn	-	3.3	1.7	2.5	-	3.4	2.3	2.8	-	2.2	1.4	1.8
	SD	-	6.8	4.7	5.9	-	6.7	5.5	6.2	-	6.4	5.5	6.0
Biog. Info.	Mn	-	-	9.7	9.7	-	-	9.4	9.4	-	-	10.7	10.7
	SD	-	-	11.4	11.4	-	-	10.0	10.0	-	-	10.3	10.3
Stat. Info.	Mn	-	-	7.3	7.3	-	-	11.9	11.9	-	-	9.6	9.6
	SD	-	-	11.0	11.0	-	-	18.1	18.1	-	-	11.3	11.3
Other	Mn	2.2	2.1	1.2	1.8	.5	.3	1.3	.7	.4	1.9	5.3	2.5
	SD	7.0	6.9	4.5	6.3	2.2	2.0	3.9	3.1	3.5	7.1	9.3	7.3

* Blank spaces indicate that the particular variable was not available for that condition.

Analyses of variance were computed on these data and the results are listed in Table 42. Although the F-ratio for groups was highly significant for each of the thirteen variables, this is due to the very large number (19,799) of degrees of freedom available.

Table 42

F-Ratios* for Weights Placed Upon Variables Used by High, Average and Low Accuracy Counselor Groups in Making First-year Grade Predictions

<u>Variables</u>	<u>Groups</u> <u>F-Ratio</u>	<u>Conditions</u> <u>F-Ratio</u>	<u>Interaction</u> <u>F-Ratio</u>
HSR	712.94	170.06	29.75
MSAT	21.68	176.32	49.47
CET	295.97	176.67	16.94
HS Math Grade	53.33	67.08	29.58
HS Eng. Grade	31.30	67.82	23.04
HS SS Grade	76.56	46.11	32.78
HS NS Grade	56.67	46.11	8.33
STEP SS	621.48	42.22	10.00
SVIB	46.19	58.10	5.71
MMP?	25.00	81.67	2.92**
Biog. Info.	8.11	--	--
Stat. Info.	39.45	--	--
Other	187.14	142.86	172.14

* All F's are significant at the .001 level except one

** Not significant at the .05 level

From the practical standpoint, however, only the difference in the average weight placed upon HSR appears important. This variable correlated .50 with the criterion, and all of the regression equations (where the units of measurement for all variables were standardized) that were computed with various combinations of variables revealed that this variable was by far the most useful of all variables for predicting the criterion. The contribution of this variable was four to five times as important as the next most useful variable, the MSAT. Table 41 shows that the average percentage weight for all three conditions given HSR by the high accuracy group was 39.2, while the same mean for the low accuracy group was 24.5. Furthermore, the average weight given both HSR and MSAT by the high accuracy group was about 67 per cent, with the low accuracy group giving these two variables an average of only about 48 per cent weighting. Therefore, the high accuracy group members, if they did use an implicit "regression equation", weighted HSR much more in line with the optional weighting for this variable as indicated in the actual regression equation. It is possible that the low accuracy group effectiveness could have been improved by teaching them that they were placing too much importance on certain variables and not enough on the most important single variable. Further, this finding also suggests that the low accuracy group might not have been too well informed on the construct being predicted.

The mean percentage for estimated weights given to the thirteen variables by these accuracy groups in predicting over-all college grades are listed in Table 43, with the F-ratios computed on these data shown in Table 44.

Table 43

Mean Percentages for Estimated Weights Placed Upon Variables*
by the High, Average, and Low Accuracy Counselor Groups
in Predicting Over-all College Grades

Variables		High (N=12)				Average (N=42)				Low (N=12)			
		Conditions			Tot.	Conditions			Tot.	Conditions			Tot.
		I	II	III		I	II	III		I	II	III	
HSR	Mn	42.2	39.1	39.7	40.3	34.0	33.1	27.6	31.6	27.9	22.9	19.4	23.4
	SD	15.2	18.5	15.9	16.6	18.3	17.0	16.9	17.7	16.6	13.4	10.8	14.2
MSAT	Mn	29.8	28.6	28.2	28.8	30.7	30.7	25.3	28.9	28.9	25.8	22.4	25.7
	SD	11.9	13.6	7.5	12.3	13.9	12.6	12.9	13.4	14.1	12.1	11.5	12.9
CET	Mn	13.1	9.3	6.6	9.7	16.4	14.6	11.1	14.0	16.1	15.4	11.2	14.2
	SD	11.2	9.5	7.8	10.0	12.9	11.5	10.0	11.7	10.9	10.1	9.2	10.3
HS Math Grade	Mn	3.7	2.6	1.9	2.7	5.3	4.1	2.8	4.1	6.5	6.2	5.1	5.9
	SD	6.3	5.6	4.3	5.5	7.4	5.4	5.2	6.4	7.3	6.7	5.8	6.7
HS Eng. Grade	Mn	3.3	1.8	1.7	2.2	5.5	3.8	2.7	4.0	5.8	5.3	4.4	5.2
	SD	5.9	4.5	4.0	4.9	7.4	5.7	5.0	6.2	6.4	6.3	5.7	6.1
HS SS Grade	Mn	3.1	1.6	1.6	2.1	3.9	3.1	2.2	3.1	5.5	4.9	3.7	4.7
	SD	6.1	4.4	3.9	5.0	5.8	5.0	4.4	5.1	6.3	6.5	5.5	6.2
HS NS Grade	Mn	3.4	2.1	1.6	2.4	3.9	3.3	2.3	3.1	5.1	5.0	3.8	4.6
	SD	6.2	4.9	3.8	5.4	5.8	5.2	4.4	5.2	6.3	6.6	5.5	6.2
STEP SS	Mn	3.3	2.0	1.7	2.4	5.4	4.9	3.7	4.6	7.5	7.8	4.9	6.7
	SD	6.2	4.9	4.0	5.2	7.5	7.0	6.0	6.9	9.5	9.2	7.4	8.8
SVIB	Mn	-	3.6	1.8	2.7	-	5.8	4.1	5.0	-	4.9	2.7	3.8
	SD	-	6.9	4.7	6.0	-	8.6	7.2	8.0	-	7.7	5.1	6.6
MMPI	Mn	-	4.0	2.3	3.1	-	4.3	2.8	3.6	-	3.6	2.5	3.1
	SD	-	7.2	4.9	6.2	-	7.6	6.1	7.0	-	9.6	8.3	9.0
Biog. Info.	Mn	-	-	11.8	11.8	-	-	12.4	12.4	-	-	14.3	14.3
	SD	-	-	13.4	13.4	-	-	12.1	12.1	-	-	13.4	13.4
Stat. Info.	Mn	-	-	5.4	5.4	-	-	10.8	10.8	-	-	7.0	7.0
	SD	-	-	10.3	10.3	-	-	17.3	17.3	-	-	9.7	9.7
Other	Mn	2.2	2.2	1.4	1.9	.7	.4	1.7	.9	1.5	3.0	6.0	3.5
	SD	7.2	7.1	5.1	6.5	4.0	2.7	5.0	4.1	5.7	8.3	10.0	8.4

* Blank spaces indicate that the particular variable was not available for that condition.

Although, again, all the F values for the 13 variables were highly significant for the differences among the means for the groups, only the differences for HSR appear to have any practical relevance. While the mean percentage weight given this variable by the high accuracy group was 40.3, the mean percentage weight for the low accuracy group was only 23.4.

Table 44

F-Ratios* for Weights Placed Upon Variables
Used by Most, Average, and Least Accurate Counselors
in Making Over-all College Grade Predictions

<u>Variables</u>	<u>Groups</u> <u>F-Ratio</u>	<u>Conditions</u> <u>F-Ratio</u>	<u>Interaction</u> <u>F-Ratio</u>
HSR	1194.33	141.28	21.11
MSAT	100.00	157.90	26.40
CET	259.61	316.84	8.16
HS Math Grade	325.42	111.67	4.58**
HS Eng. Grade	295.45	127.73	9.35
HS SS Grade	295.29	121.76	6.47
HS NS Grade	216.67	103.33	5.56
STEP SS	466.13	98.71	14.19
SVIB	72.00	149.71	1.71***
MMPI	5.00**	91.76	1.18***
Biog. Info.	13.88	--	--
Stat. Info.	71.68	--	--
Other	264.74	108.42	102.11

* All F-Ratios are significant at the .001 level except four

** Significant at the .05 level

*** Not significant at the .05 level

The optional weights determined statistically for these variables indicated that HSR was by far the most useful predictor of over-all college

academic achievement. It is possible that the predictive effectiveness of the low accuracy group could have been improved through a greater knowledge of the criterion being predicted; and it is also possible that such information could be taught.

Comparisons on Psychometric Data

The high and low accuracy counselors were compared on scores obtained from the MAT, the MMPI, the EPPS, and the SVIB. Altogether, comparisons were made on a total of 77 variables. Of these 77 variables, only six differentiated significantly at the .05 level between these groups. However, in terms of probability statistics, about four such differences would have been expected to occur by chance ($77 \times .05 = 3.85$).

Summary data for the six variables that were significant are given in Table 45.

Table 45

Summary Data for the Psychometric Variables that Differentiated Significantly Between the High and Low Accuracy Groups

Variables	High (N=12)		Low (N=12)		t	P
	Mn	SD	Mn	SD		
MAT	65.90	9.34	47.64	13.70	3.65	.01
Pt(MMPI)	27.90	3.11	25.18	2.68	2.20	.05
SVIB						
Architect	28.50	11.07	18.16	11.36	2.15	.05
Veterinarian	16.42	9.19	24.54	8.45	2.16	.05
YMCA Director	31.00	5.50	37.27	7.20	2.30	.05
Mortician	23.25	9.94	31.82	8.15	2.21	.05

Of the six that were significant, perhaps the results for the MAT and Pt scale of the MMPI are most meaningful. The first of these suggests that counselors in the high accuracy group were better able to understand and deal with abstract concepts than counselors in the low accuracy group were able to do. Solving analogy problems and making predictions do seem to involve similar thought processes, particularly when predictions are made with some "construct" in mind.

The significant difference on the Pt scale would suggest that the better counselors were more conscientious and compulsive than counselors composing the low accuracy group. However, this finding raises several questions. Does this difference indicate that counselors who predict with greater accuracy are individuals who need to strive to build up greater knowledge of constructs with which they work, and when combined with superior ability to handle abstract concepts they are able to do so? This seems to be the most reasonable interpretation of these results. But another question that deserves consideration is the extent to which this same need to be conscientious and compulsive influenced counselors' in the manner in which they undertook the rather demanding task of making these predictions. That is, it could be argued that the high accuracy group was better than the low accuracy group because of these personality characteristics (ignoring the MAT differences) in that they applied themselves to a greater extent.

The most practical way to assess counselors' application to this task seemed to be in terms of the amount of time they spent getting the job done. It was possible to keep time records on 53 of the 66 counselors, which included all but the SCB counselors and one HS counselor. The time records showed that the amount of time spent ranged from about 14 to 38 hours.

The counselors were classified into five "time" groups and comparisons made on the hits and r 's for both first-year and over-all college grade predictions. The five groups were: (1) 20 hours or less, (2) 21-25 hours, (3) 26-30 hours, (4) 31-35, and (5) 36 or more hours. The distribution of counselors for these five groups was 7, 15, 19, 7, and 5. No differences were found that even approached statistical significance at the .05 level for any of the analyses made.

Thus, there were no results that suggested that time spent on this task was related to predictive accuracy.

Therefore, the first interpretation that the high accuracy group counselors were better able to handle abstract constructs and were somewhat more compulsive seems to be legitimate.

As indicated, four of the 48 SVIB scales were significant at the .05 level. But because this is close to the number that would be expected by chance and because of the lack of any logical relationship among these four scales, these results do not seem to hold much meaning.

Comparisons on Biographic Data

Comparisons were also made between the high and low accuracy groups on the biographic data obtained from the questionnaire that was filled out by each counselor. Although the N 's were small, it was possible to compute a chi square for each item by collapsing the response frequencies. In most cases, however, it was still necessary to use the Yates' correction because of the small frequencies involved.

None of the obtained chi squares were significant at the .05 level of probability, which suggested that this type of counselor information was

not related to predictive accuracy. Counselors seem to be too homogeneous to have much hope of finding any real differences on this type of data. For example, father's educational level or the size of high school attended does not seem to have much effect upon predictive efficiency.

Comparisons on Reliability of Predictions

The high, average, and low accuracy groups were compared on the mean reliability r 's for both first-year and over-all college grade predictions. These data are presented in Table 46.

Table 46

Mean Reliability r 's for the Three Accuracy Groups
in Making Predictions of First-year and Over-all College GPA's

Accuracy Group	Condition I		Condition II		Condition III		Total	
	1	2	1	2	1	2	1	2
High	.87	.81	.92	.90	.88	.88	.89	.86
Average	.82	.82	.88	.87	.87	.85	.85	.85
Low	.84	.82	.83	.83	.88	.81	.83	.82

1 = First-year GPA r 's

2 = Over-all college GPA r 's

Inspection of this table shows, first, that these mean r 's were very high regardless of the degree of accuracy. Second, counselors composing the low accuracy group appeared to be about as reliable in their responses as were the high accuracy counselors.

These reliability r 's were determined by having counselors make the same predictions two times for 25 cases for each of the three conditions included in this study. Because all of these r 's were both high and very similar, these results suggest that whether a counselor is relatively accurate or inaccurate in his predictions, he seems to be very consistent.

Counselor Consistency in Use of Data

A previous section discussed the accuracy of predictions in relation to the consistency in which available case data were used by counselors in making these predictions. Counselors were grouped into four classifications on the basis of consistency or inconsistency in use of data. Such a procedure provided implicit information about the method used by counselors in making their predictions, e.g., a "regression equation" or some less rigid system.

It was concluded that the use of a method was not in itself the sole factor in increasing predictive accuracy, but knowledge of the construct being predicted is very crucial. However, a greater knowledge about the construct seems to result in the use of some form of a "regression equation". All SCB counselors (who were superior to the other groups in predictive accuracy) used some form of an implicit equation in prediction making.

It is interesting that of the 12 counselors identified here as the high accuracy group, 10 were previously classified in consistency groups 1 or 2, which suggested the use of an implicit "regression equation" of some form. On the other hand, only three of the low accuracy group were classified in consistency groups 1 and 2, and nine were classified in groups 3 and 4. Therefore, while the high accuracy counselors tended to use a "regression equation", the low accuracy counselors did not.

The chi square computed on these frequencies (and using Yates correction) was 6.04, which is significant at the .02 level of probability. Thus, further evidence is added which suggests that counselors who do the best job of predicting tend to use an implicit equation of some form.

Chapter V

COUNSELOR PREDICTIONS OF STUDENTS' MAJORS

Predictive Accuracy of Counselor Groups

An assessment was made of the accuracy with which the counselor and non-counselor groups were able to predict whether students would be successful in the major programs they selected at the time of admission into the Arts College at the University of Minnesota. The procedure used in determining the number of hits for these judges was described in Chapter III. Briefly, the number of hits was determined by counting the number of students correctly predicted not to remain in their major programs because they did not complete college successfully at Minnesota; plus, for students who did graduate, the number correctly predicted to remain in their programs and the number correctly predicted to change to other programs.

Making this prediction was altogether different from making predictions about students' academic achievement. Whereas most counselors had a fairly firm understanding of some of the variables related to academic achievement, they were very uncertain about the constructs they were trying to predict in relation to majors. This uncertainty was anticipated, of course, because research is scanty that is of real value to counselors in determining factors that are related to persistence in students' major fields of study. And predicting what an individual will do is even more risky. However, it was felt that perhaps there were differences among counselors in the nature and amount of implicit knowledge they had built up from their counseling experiences. Actually, many counselors often find themselves giving this type of information to their clients because prediction

is a fundamental part of educational and vocational counseling. This part of the study attempted to assess whether there were differences among counselors in their knowledge of factors related to success in various academic programs.

Summary data for the mean number of major hits correctly predicted by the various groups are shown in Table 47.

Table 47

Summary Data for the Number of Hits Predicted for Majors
by the Counselor and Non-Counselor Groups

Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
HS	43.1	7.6	41.8	7.7	44.5	6.6	43.1	7.4
AC	46.9	9.6	47.6	7.0	46.4	10.3	46.9	9.1
SCB	49.7	4.3	48.7	4.3	53.9	3.1	50.8	4.6
NC	39.8	9.8	42.3	9.4	35.4	10.2	39.2	10.2
Total	44.1	8.7	43.9	8.1	44.5	9.5		

Table 48 reveals that the F value for groups was significant at the .001 level of probability, suggesting that there were true differences among these groups in predicting whether or not a student would remain in the major program he initially selected. As was found with the predictions of hits for academic achievement, the SCB counselors were superior to any of the other groups in predicting hits for majors.

Table 48

Analysis of Variance Results for Number of Hits Predicted for Majors by the Counselor and Non-Counselor Groups

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Groups	223.39	3	74.46	18.80	.001
Conditions	.13	2	.07	<1	
Interaction	43.90	6	7.32	1.85	
Error		231	3.96		

Table 47 shows that the total mean number of hits ranged from a high of 50.8 for the SCB group to a low of 39.2 for the NC group. Because the F value for conditions was not significant (.05 level), the differences between the total means for these groups were tested. Using the t test for heterogeneous variances (Edwards, 1960, p. 106), the SCB group predicted significantly more hits than the HS group at the .001 level ($t = 7.48$), more than the AC group at the .02 level ($t = 2.41$), and more than the NC group at the .001 level ($t = 6.74$). The AC group mean was better than the HS group mean at the .02 level ($t = 2.42$) and better than the NC mean at the .001 level ($t = 3.68$). The HS group predicted more hits than the NC group at the .05 level, the t being 2.32.

Perhaps primarily because of greater opportunity to work directly with students at all educational levels, thereby building up greater knowledge about the constructs being predicted, the SCB counselors were superior to any of the other groups. Although not originally intended as part of this study, it was also found that the SCB counselors obtained a significantly higher MAT mean score than any of the other groups, which suggests greater ability to handle abstract concepts and constructs.

It is of particular importance to note that the F-ratio for conditions was not significant. This is rather surprising in that predictions did not improve after the SVIR and the MMPI were made available in condition II, and the biographical information in condition III. Differences in mean hits showed up among these groups when counselors had only students' aptitude test scores and past academic records to use in making these predictions, and the relative performance of these groups remained fairly constant even when more data became available.

Making this prediction required counselors to approach each case separately in an attempt to build a construct for each student. An assessment of the consistency (as defined and used with the predictions of academic achievement) with which counselors used data revealed that this is what counselors did. With the same definition of "consistency" as used previously, it was found that counselors were all classified into groups (III and IV) which indicated that a wide variety of data were used in different ways (estimated weights) in making these predictions. There was no apparent use of implicit regression equations with these predictions, which is not surprising because there are no explicit ones either.

However, these results suggest that there are differences among counselors in their ability to decide whether a given educational program is appropriate for a certain student. The counselors who can do this best seem to be in an advantageous position to assist students who are trying to make educational decisions.

Predictive Accuracy of Individual Counselors

This section was concerned with the accuracy of individual counselors in predicting whether students would remain in the educational programs they selected upon entrance to the University. Comparisons were made with the same predictions made by non-counselors and with the base rate for this sample of students for which predictions were made.

The number of hits that the individual counselors predicted correctly are listed in Table 49.

Table 49
Number of Hits for Each Counselor in Predicting
Whether Students Would Remain in Their Majors

Counselor No.	Condition				Counselor No.	Condition				Counselor No.	Condition			
	I	II	III	Mn		I	II	III	Mn		I	II	III	Mn
HS 1	46	34	45	42	23	53	62	54	56	45	33	49	33	38
2	45	44	41	43	24	40	43	46	43	46	44	48	52	48
3	47	51	49	49	25	49	46	54	50	47	57	50	59	55
4	37	30	39	35	26	33	41	40	38	48	46	56	33	45
5	50	56	50	52	27	48	42	45	45	49	35	37	32	35
6	28	33	42	34	28	41	51	48	47	50	60	50	52	54
7	47	43	47	46	29	49	47	45	47	51	59	55	56	57
8	50	42	55	49	30	42	41	44	42	52	57	59	59	58
9	43	36	40	40	31	58	50	50	53	53	36	34	30	33
10	55	48	49	51	32	35	37	35	36	54	33	37	49	40
11	42	42	40	41	33	29	36	44	36	SCB 55	57	50	52	53
12	50	43	49	47	34	41	39	38	39	56	47	54	51	51
13	43	36	40	40	35	42	34	30	35	57	55	54	51	53
14	48	53	52	51	36	52	50	54	52	58	45	50	52	49
15	38	33	39	37	37	48	45	44	46	59	50	50	51	50
16	31	33	40	35	38	49	49	35	44	60	45	42	53	47
17	32	33	35	33	39	29	36	44	36	61	57	52	54	54
18	35	26	29	30	40	42	39	46	42	62	45	40	53	46
19	44	47	50	47	AC 41	57	49	52	53	63	48	46	55	50
20	35	40	46	40	42	48	47	55	50	64	47	52	56	52
21	42	33	49	41	43	44	50	38	44	65	49	45	57	50
22	55	49	57	54	44	47	45	49	47	66	51	49	62	54

High School Counselors: Numbers 1 thru 40

Arts College Counselors: Numbers 41 thru 54

Student Counseling Bureau Counselors: Numbers 55 thru 66

In assessing the predictive accuracy of these individual counselors, the mean number of hits for all three conditions was used since the mean number of hits for the individual counselor groups was very similar for each condition (Table 47).

In comparing individual counselors with non-counselors, the aim was to determine which counselors, if any, could predict significantly more hits than the mean for the NC group. A chi square test revealed that a frequency of 53 hits was the minimum number necessary to predict significantly better (.05 level) than the mean of 39 hits for the NC group.

Observation of Table 49 shows that twelve counselors obtained mean hits of 53 or more, suggesting that these counselors were able to predict a greater number of hits than the NC mean than would be expected to occur by chance. On the other hand, no counselors obtained a mean number of hits significantly less than the NC group mean of 39, but 15 had a mean of 39 or below.

Thus, whatever knowledge counselors relied upon in making these predictions, the results showed that some were more accurate than others. It should be clearly understood, however, that no implication is being made here that predictive accuracy for hits has an automatic, direct relationship with over-all counselor effectiveness. It certainly could be argued, however, that the counselor who is better informed and knows more about the various programs a particular student might have under consideration can do a better job of educational counseling!

Information about the base rate for this prediction for the sample of Arts College students studied gives some indication of the difficulty of the task. Fifty-three of the 100 students did not complete successfully any

four-year program (at Minnesota) and, of those 47 who did, 24 changed their majors. Therefore, if every student was predicted not to graduate or remain in his program, a total of 77 hits would be recorded. No counselor came close to this figure. Obviously, however, a counselor would be doing a very poor job of counseling if he approached every client in such a negative manner.

The point is that this was an extremely difficult group of students to predict. It is very probable that many of the students in this sample were uncertain about their educational goals even though they were willing to indicate on the application forms that they had selected a major. In spite of these conditions, some counselors were better than others at deciding what these students would do.

Finally, it is noteworthy that of the 12 counselors identified who were best able to make this prediction, five were AC counselors, four were SCB counselors, and three were ME counselors. Since five AC counselors were able to do so well, it appears that amount of formal counselor training is not in itself directly related to accuracy in making this prediction. AC counselors received less formal training than any of the counselor groups.

Amount of Experience in Relation to Predictive Accuracy

An assessment was made of the relationship between amount of counseling experience and accuracy in predictions made about students remaining in their initially selected educational programs. Information about each counselor's experience was obtained from a questionnaire, and the amount determined in the same way as was previously described in the chapter for predictions of academic achievement. In fact, the same classifications of

amount of experience were used with the "major" predictions as were used previously. These were:

- I - 2 years or less experience (N = 16)
- II - 3 to 5 years of experience (N = 20)
- III - 6 to 10 years of experience (N = 20)
- IV - 11 years or more experience (N = 10)

Summary data for these experience groups for the "major" predictions are listed in Table 50.

Table 50

Summary Data for the Number of Hits for the
Counselor Experience Groups for the "Major" Predictions

Experience Groups	Conditions						Total	
	I		II		III		Mn	SD
	Mn	SD	Mn	SD	Mn	SD		
I	48.6	8.4	46.9	6.9	47.6	10.1	47.7	8.6
II	41.2	7.9	41.3	7.9	42.2	7.6	41.5	7.8
III	45.6	7.5	43.8	7.5	48.8	4.8	46.1	7.0
IV	46.2	5.1	47.1	6.0	49.4	5.9	47.6	5.9
Total	45.1	8.1	44.3	7.7	46.6	8.0		

The analysis of variance results are presented in Table 51 and it can be seen that the F for the experience groups was significant at the .001 level of probability. This would suggest that the amount of experience counselors have is related to accuracy in making this predictions, but observation of the means in Table 50 indicates that this actually does not seem to be the case. The mean for Group II, counselors with 3 to 5 years experience, was considerably below the means for the other three groups which were essentially undifferentiated. That is, in terms of years of experience,

counselors with two years or less experience (Group I) recorded just as many hits on the average as did the counselors in Groups III and IV with much more experience.

Table 51

Analysis of Variance Results for Counselor Experience Groups
for Number of Hits for the "Major" Prediction

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Groups	75.29	3	25.10	6.50	.001
Conditions	10.52	2	5.26	1.36	
Interaction	10.60	6	1.77	<1	
Error		186	3.86		

In attempting to gain some insight as to why these results should occur, it is profitable to look at the make-up of these experience groups. Group II, which deviated from the others, is composed of twenty counselors, fifteen of whom are HS counselors. (Table 14 gives the composition of the experience groups in terms of HS, AC, and SCB counselors.) Therefore, the low mean for this experience group is heavily influenced by HS counselors who, as a group, had a mean below either the AC or SCB group means. The mean for these fifteen HS counselors was 40.7, which is even below the total HS group mean of 43.1 (Table 47).

On the other hand, of the sixteen counselors in experience Group I, ten were AC counselors. These ten AC counselors had a mean of 49 hits for the "major" prediction.

Therefore, the amount of counseling experience per se does not appear to be related to accuracy in making this prediction. What seems most important is where the experience was accrued. HS counselors do not

counsel directly with students in the Arts College at the University of Minnesota and, thus, do not have the opportunity to test hypotheses and generally build up a fund of knowledge of the constructs required in making these predictions.

Another observation about the AC counselors seems relevant. Previous results showed that AC counselors with two years or less experience recorded more hits for the academic achievement predictions than the AC counselors with three or more years of experience. It was stated in relation to those results that informal training might have been the main reason the newer counselors did better. It is interesting to observe that the newer AC counselors, with little or no formal counselor training, also recorded more "major" hits than the more experienced AC counselors, the means for the two groups being 49.0 and 41.8, respectively. Thus further evidence supports the earlier conclusion that perhaps counselors can be taught how to use information effectively in a particular situation. Reference again to Table 49 reveals that five of the fourteen AC counselors had a mean of at least 53 hits (the number needed to predict significantly more hits at the .05 level than the NC group mean) and the total mean for this group would have been much higher except that a few of the AC counselors did very poorly.

Therefore, although the F for the experience groups was significant, when considered in this light it cannot be concluded that counselors' predictive skill for the "major" predictions necessarily increases as amount of experience increases. That is, predictive accuracy and years of experience are not linearly related. This is true even for the SCB counselors. What seems of most importance is where the counselor works.

Counselor Confidence in "Major" Predictions
in Relation to Predictive Accuracy

Counselors were asked to indicate the degree of confidence they had in each "major" prediction made. That is, on the basis of the case information available, they were asked to indicate how certain they were that a given prediction was correct. The degree of confidence in a prediction was made on a nine-point scale, ranging from "Very confident" to "Not at all confident". But, as was done with the predictions of scholastic achievement, three classifications of confidence were used in assessing the relationship with predictive accuracy. These were: most confidence, moderate confidence, and least confidence.

Based upon the average degree of confidence in the 300 "major" predictions made (excluding the additional 25 cases in each condition for reliability purposes), each counselor was placed into one of the three confidence groups. Eleven counselors were included in the "most confidence" group, each having a mean below 4.0 on the nine-point scale of confidence. Eight were placed in the "least confidence" group, with means above 6.0 on the nine-point scale. The remainder of the counselors, 47, composed the "moderate confidence" group and they had means between 4.0 and 6.0. Therefore, of the 66 counselors participating in this study, about 71 per cent were in the middle classification.

The mean number of hits for each of the confidence groups for each condition is listed in Table 52.

Table 52

Summary Data for Hits for the Confidence Groups
for the "Major" Predictions

Confidence Groups	Conditions						Total	
	I		II		III			
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
Most	41.8	7.7	43.4	8.7	42.2	7.3	42.5	8.1
Moderate	45.3	7.9	44.7	7.7	46.9	7.4	45.6	7.7
Least	48.5	7.9	43.3	5.9	51.0	8.2	47.6	8.1
Total	45.1	8.1	44.3	7.7	46.6	8.0		

Table 53 shows that the F-ratio for groups was significant at the .05 level of probability, suggesting that there were differences among these confidence groups on the mean number of hits they were able to predict correctly. Inspection of the means in Table 52 shows, however, that the counselors who were least confident about the accuracy of their predictions obtained more mean hits than counselors who were most confident. The total mean number of hits for the former group was 47.6, while the mean for the latter group was 42.7.

Table 53

Analysis of Variance Results for the Confidence Groups
for Hits for the "Major" Predictions

Source of Variation	Sum of Squares	d.f.	Mean Square	F	P
Groups	40.17	2	20.09	4.09	.05
Conditions	12.80	2	6.40	1.30	
Interaction	22.36	4	5.59	1.14	
Error		189	4.91		

These results corroborate the findings for the predictions of first-year academic achievement, where counselors who were typically least confident about their predictions obtained significantly more hits than counselors who were typically most confident about their predictions.

It is relevant to note the composition of these confidence groups in reference to the HS, AC, and SCB counselors. Of the eleven counselors typically most confident about their predictions, seven were HS counselors, three were AC counselors, and one an SCB counselor. Of the eight composing the "least confidence" group, the HS, AC, and SCB representation was four, two, and two respectively. Therefore, these results are not accountable for simply on the basis of the "least confidence" group being composed of mostly SCB counselors and the "most confidence" group composed of all HS counselors.

Finally, it is of interest to point out that of the eleven counselors in the "most confidence" group, nine were classified in the corresponding group for predictions of first-year grades. Of the eight counselors expressing least confidence in their "major" predictions, six were placed into the corresponding group for predictions of first-year grades. Therefore, the degree of confidence individual counselors are willing to express seems fairly consistent regardless of the type of prediction that is being made.

Counselor Self-Ratings in Relation to Predictive Accuracy

Each of the HS, AC, and SCB counselors was asked to rate himself on his general counseling effectiveness when compared with other counselors he knew with similar responsibilities. Counselors had five alternatives from which to choose in making this self-rating: (1) one of the most effective, (2) more effective than most, (3) about average in effectiveness, (4) not as

effective as most, (5) one of the least effective. However, as was done with the predictions of academic achievement, only two groups were used in assessing the relationship between self-ratings and accuracy for the "major" predictions. These were: (1) counselors who rated themselves above average and (2) counselors who rated themselves average or below. (The rationale for this procedure was discussed previously for predictions of achievement.) The "above average" group was composed of 26 counselors and the "average" group included 37. Three counselors did not rate themselves.

Summary data for these self-rating groups are presented in Table 54.

Table 54

Summary Data for Number of Hits for the Self-Rating Groups for "Major" Predictions								
Self-Rating Groups	Conditions						Total	
	I		II		III			
	Mn	SD	Mn	SD	Mn	SD	Mn	SD
Above Average	43.8	10.2	43.5	8.1	45.7	7.7	44.3	8.1
Average	47.0	7.1	45.4	7.1	48.1	7.7	46.8	7.4
Total	45.7	7.2	44.6	7.6	47.1	7.8		

The F value for groups, shown in Table 55, was not significant at the .05 level. Although the "average" group obtained a larger mean number of hits than the "above average" group, this difference apparently could have resulted because of the operation of chance factors.

Table 55

Analysis of Variance Results for the Self-Rating Groups
for Number of Hits for the "Major" Predictions

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>
Groups	9.55	1	9.55	1.77
Conditions	6.20	2	3.10	<1
Interaction	.44	2	.22	<1
Error		183	5.40	

Therefore, these results do not corroborate the results found for the accuracy of hits for predictions of first-year achievement, where counselors who rated themselves as "average" obtained significantly more hits than the "above average" group. However, it can be concluded with considerable certainty that counselors who rate themselves highly do not predict with greater accuracy than counselors who rate themselves as average.

As was stated previously in the chapter for predictions of academic achievement, no attempt is being made here to suggest that actual counselor effectiveness on the job is highly related to ability to make accurate predictions of the types called for in this investigation. It was assumed that there are individual differences among counselors on general counseling effectiveness, and this part of the study was considered an exploratory effort to determine if there was a relationship between predictive accuracy and how counselors were willing to rate themselves.

Estimated Weights Placed Upon Variables by the Counselor and
Non-Counselor Groups in Making "Major" Predictions

In making their predictions about whether or not students would remain in the educational major programs they selected at the time of admissions, counselors were asked to estimate how they were using the available data in reaching each prediction. The assumption was that 100 per cent of "something" went into the making of each judgment. There is no question that this was only a rough estimation, but two kinds of information were obtained that were of interest to this study.

One is the consistency with which counselors use information, or the weighting that was consistently placed upon certain variables in arriving at these predictions. This approach attempted to assess whether counselors used an implicit "regression equation" or tried to build a separate "person" for each case. As reported in the chapter for predictions of academic achievement, counselors varied considerably in the consistency with which they used data in making predictions of that type, and counselors were classified into four "consistency" groups. However, in making predictions for majors, it was discovered that all counselors were highly inconsistent in the use of available case data, and none apparently used an implicit "equation(s)" for making these predictions. Counselors tended to handle each case independently.

The second kind of information obtained was which of the variables the counselors used and roughly in what order of importance. The remainder of this section will report the results found in connection with the weights placed upon data by the HS, AC, SCB, and NC groups.

Summary data for these groups are listed in Table 59. This table shows the mean weight placed upon each of the variables by these four groups for each of the three conditions.

Table 56

Mean Percentages for Estimated Weights Placed Upon Variables*
by Each Group in Making Predictions About Students Remaining in Their Majors

Variables		HS Counselors				AC Counselors				SCB Counselors				Non-Counselors			
		Conditions				Conditions				Conditions				Conditions			
		I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.
HSR	Mn	24.2	17.9	12.5	18.2	24.8	19.2	15.8	19.9	28.5	15.4	8.7	17.5	10.1	4.7	9.3	8.0
	SD	19.5	15.7	14.0	17.2	16.1	14.4	14.8	15.5	20.8	17.2	12.8	19.1	15.3	9.7	15.9	14.1
MSAT	Mn	23.2	19.7	13.3	18.7	27.0	22.6	17.5	22.4	20.6	14.3	9.8	14.9	22.8	17.4	10.3	16.9
	SD	16.7	14.4	13.1	15.4	14.0	14.0	14.0	14.5	15.7	14.7	13.5	15.0	22.0	20.1	15.1	19.9
CET	Mn	14.3	10.1	6.4	10.3	14.5	8.1	5.1	9.3	8.5	2.8	.6	4.0	14.3	7.3	7.4	9.7
	SD	14.0	11.4	11.3	12.2	12.4	9.6	8.7	11.1	12.8	6.6	3.0	9.1	18.7	13.6	14.3	16.0
HS Math Grade	Mn	11.9	6.7	4.1	7.5	9.7	5.7	3.6	6.4	8.6	3.2	1.8	4.6	13.0	5.9	5.6	8.1
	SD	15.0	10.8	8.6	12.2	11.1	7.2	5.8	8.7	13.5	7.4	6.1	10.0	18.2	12.3	11.4	14.7
HS Eng. Grade	Mn	6.6	3.1	1.9	3.9	4.3	2.9	1.6	3.0	2.8	1.1	.1	1.3	6.4	2.2	2.6	3.6
	SD	11.9	6.4	4.9	11.3	6.7	5.0	3.8	5.3	6.8	3.4	1.1	4.8	12.4	6.9	7.3	9.2
HS SS Grade	Mn	6.0	3.1	1.5	3.5	5.4	3.7	1.9	3.6	3.7	1.2	.2	1.7	7.1	2.4	2.5	4.0
	SD	10.0	6.8	4.3	7.6	8.0	5.9	3.9	6.3	8.4	3.8	1.5	5.6	14.5	6.5	8.3	10.6
HS NS Grade	Mn	6.9	4.0	2.3	4.4	6.9	4.3	2.6	4.6	4.9	2.0	1.1	2.7	9.5	3.2	4.2	5.6
	SD	11.2	8.3	5.8	8.4	9.4	6.8	4.8	7.7	9.7	5.6	4.6	7.2	16.2	8.7	10.2	12.5
STEP SS	Mn	5.2	3.2	1.7	3.4	8.0	4.9	3.2	5.3	6.6	2.8	.7	3.4	9.0	4.1	1.9	5.0
	SD	9.7	7.0	4.6	8.2	10.6	7.8	6.5	8.7	10.1	6.7	3.7	7.7	14.8	10.6	7.2	11.7
SVIB	Mn	-	26.7	18.1	22.4	-	25.0	20.5	22.8	-	35.0	31.9	33.4	-	45.6	21.2	33.4
	SD	-	20.3	16.6	19.1	-	19.6	14.2	16.9	-	27.9	21.8	5.0	-	31.3	29.1	46.5
MMPI	Mn	-	4.3	2.6	3.4	-	5.6	3.6	4.6	-	7.3	4.4	5.8	-	.7	.7	.7
	SD	-	8.4	6.3	9.4	-	9.0	7.1	8.1	-	12.2	8.9	10.8	-	5.7	5.1	5.4
Biog. Info.	Mn	-	-	32.5	32.5	-	-	25.5	25.5	-	-	24.8	24.8	-	-	15.0	15.0
	SD	-	-	40.4	40.4	-	-	18.5	18.5	-	-	21.3	21.3	-	-	22.5	22.5
Stat. Info.	Mn	-	-	2.7	2.7	-	-	1.6	1.6	-	-	6.4	6.4	-	-	4.7	4.7
	SD	-	-	6.7	6.7	-	-	5.5	5.5	-	-	18.7	18.7	-	-	15.4	15.4
Other	Mn	6.6	6.5	4.8	6.0	.6	3.7	3.9	2.7	18.0	8.1	11.1	12.4	10.6	7.9	2.8	7.1
	SD	20.3	19.6	11.5	17.5	6.4	13.9	10.2	10.7	27.1	16.7	21.5	22.8	22.8	22.2	11.8	19.9

*Blank spaces indicate that the particular variable was not available for that condition.

Primarily because of the almost 25,000 degrees of freedom available, all the F-ratios were highly significant for groups which suggested that significantly different amounts of weights were placed on each variable by the four groups. These data are shown in Table 57. However, inspection of Table 56 shows that many of the differences were very small and, therefore, of little practical relevance. Also, in some cases the HS, AC, and SCB groups were largely undifferentiated on the mean weights, but differences occurred when these three were compared with the NC group means.

Table 57

F-Ratios* for Groups, Conditions, and Interaction Terms
for the Variables Used in Making Predictions About Students
Remaining in Their Majors

<u>Variables</u>	<u>Groups</u> <u>F-Ratio</u>	<u>Conditions</u> <u>F-Ratio</u>	<u>Interaction</u> <u>F-Ratio</u>
HSR	538.00	715.38	105.56
MSAT	151.95	571.05	11.45
CET	283.71	773.03	9.89
HS Math Grade	61.83	451.75	143.33
HS Eng. Grade	101.50	336.25	13.50
HS SS Grade	72.22	385.33	9.56
HS NS Grade	62.42	348.03	16.97
STEP SS	73.86	659.32	14.77
SVIB	269.28	713.31	164.72
MMPI	255.26	145.53	18.95
Biog. Info.	228.49	--	--
Stat. Info.	53.81	--	--
Other	233.01	54.42	54.42

* All F-ratios are significant at the .001 level

Several of the differences that showed up do seem to have some practical value. The SCB group averaged putting more weight upon the SVIB than did either of the HS or AC groups, while the HS counselors tended to put more importance upon the biographical information than did either of the other two counselor groups. A number of the HS and AC counselors indicated to the principal investigator that they did not use the SVIB more because they felt they were not familiar enough with this instrument to use it intelligently. The SVIB and the biographical information, however, were the two variables that received the most weighting by the counselor groups, with the next two most important variables being HSR and MSAT.

Taken together, these findings show that although there was considerable similarity on the weighting of variables by the counselor groups, there were several differences of practical importance. Two in particular were the average weights given to the SVIB and to the biographical information. The differences for the SVIB could have been partly due, however, to a felt lack of sophistication on the part of some of the HS and AC counselors in the use of this instrument.

High Accuracy Versus Low Accuracy Counselors for the "Major" Predictions

It was established in a previous part of this chapter that some counselors were more accurate at making this prediction than other counselors. The purpose of this part of the study was to identify counselors who were most and least accurate at making the "major" predictions and to compare them in two ways.

The first was a comparison on the average weight placed upon the available case information in making predictions about whether students would

remain in their initially selected majors. If sizeable differences could be found, suggesting that counselors who are most accurate use information in a different manner than the least accurate counselors, such knowledge might be useful for teaching purposes.

Second, the high and low accuracy counselors were compared on psychometric and biographic data obtained from tests and from a questionnaire. The psychological tests were the MAT, the MMPI, the EPPS, and the SVIB. Comparisons on these data were included in the study to attempt to determine if there are characteristic differences among counselors who consistently predict with relatively high accuracy and those who are consistently least accurate.

In identifying the high and low accuracy counselors, all 66 counselors were ranked on the mean number of hits for the three conditions. The number of hits for each counselor was listed in Table 49. In a previous section of this chapter, it was found that 12 counselors recorded significantly (.05 level) more hits than the mean for the non-counselor group. That is, 12 counselors obtained a mean of at least 53 hits for the three conditions in predicting whether students would remain in their initially selected majors. These 12 counselors were identified in this section as the "high accuracy" group. Conversely, the 12 counselors who ranked lowest were identified as the "low accuracy" group. The remaining 42 counselors were placed in the "average accuracy" group.

It is particularly relevant that of the 12 counselors identified as being most accurate in making the "major" predictions, eight were previously identified as being among the top 12 at making predictions of academic achievement. This indicated that there was considerable consistency among the

counselors included in this study on their skills in predicting both freshman and over-all college grades and in deciding whether a student would remain in his major program.

On the other hand, only three of the counselors who were in the "least accuracy" group for the "major" predictions were also in the corresponding group for the predictions of academic achievement. However, most of the remaining nine were among the bottom one-third for the achievement predictions, and no counselor made a dramatic reversal of being among the better predictors of academic performance.

Variables Used in Making Predictions

The mean percentage weights placed upon the variables used by these "accuracy" groups in making "major" predictions are shown in Table 58.

Table 58

Mean Percentages for Estimated Weights Placed Upon Variables*
by the High, Average, and Low Accuracy Counselor Groups
in Making "Major" Predictions

Variables		High (N=12)				Average (N=42)				Low (N=12)			
		Conditions			Tot.	Conditions			Tot.	Conditions			Tot.
		I	II	III		I	II	III		I	II	III	
HSR	Mn	24.1	17.0	10.4	17.2	26.1	18.4	12.8	19.1	22.5	16.1	13.4	17.4
	SD	18.2	16.0	14.5	17.2	18.8	15.3	13.7	17.0	21.0	17.5	15.1	18.4
MSAT	Mn	20.8	17.0	11.2	16.3	24.3	19.8	13.5	19.2	23.5	20.0	16.1	19.9
	SD	15.1	13.9	13.1	14.6	16.1	14.7	13.8	15.5	16.6	14.8	13.2	15.3
CET	Mn	11.7	6.0	2.7	6.8	12.9	8.2	4.4	8.5	16.1	11.4	9.5	12.3
	SD	12.3	9.0	5.7	10.3	13.7	10.7	8.5	11.7	17.1	14.3	9.9	12.3
HS Math Grade	Mn	8.9	3.9	1.3	4.7	10.6	5.6	3.6	6.6	13.5	8.6	5.7	9.3
	SD	12.1	7.9	4.0	9.2	13.8	9.1	7.3	10.8	17.1	12.5	8.6	13.6
HS Eng. Grade	Mn	3.9	1.5	.2	1.9	5.5	2.6	1.4	3.2	6.8	4.1	3.4	4.8
	SD	8.2	4.3	1.6	5.4	8.6	5.5	3.9	7.3	10.6	7.2	6.1	8.3
HS SS Grade	Mn	5.1	2.1	.3	2.5	5.5	6.0	1.3	4.2	5.7	3.4	2.5	3.9
	SD	10.1	5.7	1.8	7.1	9.0	3.1	3.8	6.3	9.8	7.0	5.2	7.7
HS NS Grade	Mn	5.7	2.5	.8	3.0	6.8	3.8	2.2	4.3	6.4	4.5	3.2	4.7
	SD	10.2	6.2	3.1	7.4	12.8	7.8	5.6	8.6	10.9	6.9	6.2	8.8
STEP SS	Mn	5.5	3.2	.8	3.1	5.4	3.3	1.7	3.5	8.8	4.6	3.4	5.6
	SD	9.2	7.3	2.8	7.0	8.9	6.7	4.7	7.2	12.6	8.9	6.9	10.1
SVIB	Mn	-	33.7	30.0	31.8	-	27.9	20.7	24.3	-	22.0	13.7	17.8
	SD	-	23.4	19.7	21.7	-	21.8	17.9	20.1	-	19.8	12.9	17.3
MMPI	Mn	-	8.1	4.9	6.5	-	4.7	3.0	3.9	-	3.5	1.6	2.5
	SD	-	11.6	9.7	10.8	-	8.8	6.7	8.0	-	7.2	1.4	6.0
Biog. Info.	Mn	-	-	32.5	32.5	-	-	29.7	29.7	-	-	26.7	26.7
	SD	-	-	20.1	20.1	-	-	23.2	23.2	-	-	23.8	23.8
Stat. Info.	Mn	-	-	1.5	1.5	-	-	3.4	3.4	-	-	3.6	3.6
	SD	-	-	6.3	6.3	-	-	11.6	11.6	-	-	6.2	6.2
Other	Mn	9.5	7.1	5.2	7.2	9.0	7.7	7.3	8.0	0.0	0.1	.9	.3
	SD	20.9	15.2	13.5	16.9	22.8	21.0	15.4	20.0	0.0	1.4	4.0	2.5

* Blank spaces indicate that the particular variable was not available for that condition.

The F-ratios computed for these data are given in Table 59.

Table 59

F-Ratios* for Weights Placed Upon Variables
Used by the High, Average, and Low Accuracy Counselor Groups
in Making "Major" Predictions

<u>Variables</u>	<u>Groups</u> <u>F-Ratio</u>	<u>Conditions</u> <u>F-Ratio</u>	<u>Interaction</u> <u>F-Ratio</u>
HSR	17.79	578.63	10.00
MSAT	75.21	462.57	5.71
CET	312.34	637.92	38.57
HS Math Grade	145.73	393.18	.55***
HS Eng. Grade	176.11	309.72	1.11***
HS SS Grade	109.57	543.48	38.70
HS NS Grade	42.91	249.27	4.00**
STEP SS	144.59	439.46	10.27
SVIB	392.56	245.00	11.24
MMPI	182.05	171.14	7.50
Biog. Info.	19.53	--	--
Stat. Info.	18.55	--	--
Other	234.00	7.52	8.61

* All F's are significant at the .001 level except three

** Significant at the .05 level

*** Not significant at the .05 level

Although all of the F's for the thirteen variables were significant at the .01 level, the differences among the means for a number of the variables were of such small magnitude that there appeared to be little practical significance. The most notable exception was the SVIB, where the "high accuracy" counselors put on the average almost twice as much weighting as did the "low accuracy" counselors. The total mean for the former group was 31.8 while the total mean for the latter group was only 17.8. Although not a large difference, the "high accuracy" counselors also averaged putting more weight on the biographical information in condition III than did the least accurate counselors. For condition III, the counselors that were most accurate put about 62 per cent of the weight on the SVIB and the biographical information, while the counselors that were least accurate put only about 40 per cent of the total weight on these two variables.

From these results, the most useful finding appears to be in connection with the SVIB. It seems logical, perhaps, that the "low accuracy" group might improve in predictive accuracy from instructions to put greater importance upon this interest measure. It is very probable, however, that little increase in accuracy would result from such a simple procedure. The difficulty is likely somewhat more basic in that some of these counselors lack adequate knowledge to use the SVIB effectively. It is possible that predictive accuracy could be increased for these counselors through some type of training, and not necessarily formal training. It is quite probable, too, that some of these counselors would not improve regardless of the type and amount of training received. Although many factors might be involved, some counselors would show no improvement simply because of lack of interest in working with students with educational and vocational problems and, thus, there would be no inclination to improve.

Comparisons on Psychometric Data

Comparisons were also made between the high and low accuracy counselors on scores obtained from the MAT, the MMPI, the EPPS, and the SVIB. From these four tests, a total of 77 variables were involved. Significant differences at the .05 level or better were found for only five of these, which is very close to the number that would be expected to occur by chance ($.05 \times 77 = 3.85$). (The t test for heterogeneous variances was necessary in several cases.)

Summary data for these six variables are listed in Table 60.

Table 60

Summary Data for Psychometric Variables
that Differentiated Significantly
Between the High and Low Accuracy Groups

<u>Variables</u>	<u>High (N = 12)</u>		<u>Low (N = 12)</u>		<u>t</u>	<u>P</u>
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>		
MAT	73.00	9.83	46.33	16.60	4.58	.001
EPPS						
Achievement	19.18	5.25	14.42	5.07	2.16	.05
Autonomy	15.00	2.65	11.75	3.70	2.37	.05
SVIB						
Ag. Arts T.	18.71	6.35	30.40	11.75	2.90	.05
Policeman	19.43	9.05	29.60	11.95	2.25	.05

The most notable difference that was found between the best and poorest counselors at making "major" predictions was for the MAT, which was significant at the .001 level. This finding agrees with the previous results which revealed that counselors who were most accurate at making the achievement predictions also obtained significantly higher MAT scores than did the least accurate counselors. Thus, it appears that one of the most important

factors that contributes to predictive accuracy is the ability to intellectually handle abstract concepts associated with an hypothetical construct(s).

Another point is noteworthy in attempting to identify some common factors related to counselors who can predict with greater accuracy than others. The high accuracy counselors at predicting achievement obtained a significantly higher Pt (MMPI) mean score than the low accuracy counselors. For the "major" predictions, the t of 1.92 for this variable fell just short of significance at the .05 level of probability, with the high accuracy counselors again obtaining the higher mean score. The means for the two groups were 27.18 and 24.75. Thus, the evidence seems to be consistent in suggesting that the best counselor predictors are both intellectually bright and compulsive. (The possibility of the high accuracy counselors doing better because of the need to be compulsive was discussed in the chapter for predictions of academic achievement.)

Two of the EPPS factors were also found to differentiate significantly between the high and low accuracy counselors for the "major" predictions, with the former group obtaining higher mean scores for both. The better predictors apparently have somewhat stronger psychological needs for Achievement and Autonomy. These two would fit together nicely with the previous two factors identified in attempting to picture what type of counselor is best at making predictions. Not only is he bright and compulsive but he has needs to excel, to achieve, to do his best. Perhaps these are some of the important reasons why he knows more about the constructs involved, and why he is better able to think about them abstractly.

Although two of the 48 SVIB scales were significant, these results do not seem to have much meaning.

Comparisons on Biographical Data

In addition to the psychometric data, comparisons were also made between the high and low accuracy groups on the biographic data obtained from the counselor questionnaires. Chi squares were computed, often using Yates' correction, for the frequencies involved, and none were significant at the .05 level. As was earlier concluded in connection with the achievement predictions, these results seem to indicate that counselor information of this type is unrelated to predictive accuracy. Therefore, the counselors were quite homogeneous on the biographic data shown on the questionnaire included in the Appendix.

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Chapter VI

PREDICTIONS OF STUDENTS' CAMPUS LEADERSHIP ACTIVITY

Counselors were asked to predict which students they thought would be active in seeking out and acquiring campus leadership positions at the University of Minnesota. The brief definition of leadership given to counselors for use in making this prediction is included in the Appendix of this report.

Of the 100 students included in the sample, seventeen were classified as being involved in some type of campus leadership on the basis of records obtained from the Student Activities Bureau. The remainder of 83 students were classified as non-leaders.

This was the third type of prediction that counselors made, and most counselors felt this was a more difficult task than predicting scholastic achievement or trying to decide whether a student would remain in his major. The most obvious reason why this proved to be so difficult is that predicting leadership seemed to be an entirely new experience for them, and they were very unclear on what factors to be alerted to in differentiating between leadership and non-leadership.

This part of the study was considered exploratory research and the results reported are only the findings up to this point. More research is planned on the basis of the results reported here that will improve considerably upon the design and methodology.

Predictive Accuracy of Counselor Groups

This section was concerned with assessing the predictive accuracy of the counselors and non-counselor groups. Summary data for the mean number of hits for the counselor and non-counselor groups are presented in Table 61.

Table 61

Summary Data for the Number of Hits Predicted for Leadership by the Counselor and Non-Counselor Groups

Groups	Conditions						Total	
	I		II		III			
	Mn	SD	Mn	SD	Mn	SD	Mn	SD
HS	79.6	5.0	78.2	6.0	79.9	10.7	79.2	7.7
AC	80.3	4.0	80.3	3.3	82.4	3.2	81.0	3.7
SCB	82.0	1.3	80.8	3.2	81.6	3.7	81.5	3.0
NC	77.1	9.9	80.1	8.2	81.8	8.4	79.7	9.0
Total	79.6	6.0	79.3	5.9	80.9	8.6		

The analysis of variance results, shown in Table 62, found that the F for groups was not significant at the .05 level of probability; and inspection of the means for these groups (Table 61) reveals just how little differentiation there was among these groups. The total means ranged only from 79.2 for the HS group to 81.5 for the SCB group of counselors. It is particularly interesting to note also that the mean for the NC group was 79.7. Thus, no group was able to predict better than any other group which students would or would not ultimately become involved in campus leadership of the type defined.

Table 62

Analysis of Variance Results for Number of Hits Predicted for Leadership by the Counselor and Non-Counselor Groups

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>d.f.</u>	<u>Mean Square</u>	<u>F</u>
Groups	10.29	3	3.43	1.12
Conditions	7.12	2	3.56	1.16
Interaction	9.54	6	1.59	<1
Error		231	3.06	

It is of interest, too, to note that the predictive accuracy for these groups did not increase as more case information was made available. This is somewhat surprising, particularly for condition III, where each student's high school activity record and the number of leadership positions held were made available to the counselors. The results indicate that the amount of information available had relatively little influence upon the number of cases correctly predicted.

What this most likely reflects is that counselors were predicting at about the chance level, realizing that only a small proportion of the sample would be involved in campus leadership activities. As indicated previously, 83 of the students in this sample were classified as non-leaders, and that number of hits would be recorded if every student was predicted to be a non-leader. What seems to point this observation up so dramatically is that the groups averaged almost 80 hits for condition I when all they had were ability scores and past high school academic records. This would hardly provide sufficient knowledge about a student to make a sophisticated guess about whether he would be involved in campus leadership activities.

Therefore, these results would lead to the conclusion that there were no differences among the counselor and non-counselor groups in predicting leadership activity, with all of the groups obtaining about the number of hits that would be expected by chance.

Why were such results found? At least three related reasons seem to be important. One is that this apparently was a novel experience for just about every counselor. In working with their students, most counselors very seldom concern themselves specifically with predicting leadership or with a comparison of leaders and non-leaders. Which leads to the second reason that counselors were poorly informed about the construct they were attempting to predict. A third reason might have been that the leadership criterion was too broadly defined. A more delimiting definition might have sharpened the focus somewhat. Thus, a general sharpening of the criterion being predicted plus the counselors themselves being better informed about the criterion might have resulted in more accurate predictions.

Actuarial Predictions Versus Counselor Group Predictions of Leadership Activity

In making the actuarial predictions, 25 variables were identified that differentiated significantly between the leader and non-leader groups of students. The means and standard deviations for these variables are listed in Table 63.

Table 63

Means and Standard Deviations for the Variables
that Differentiated Significantly Between the Leaders and Non-Leaders

<u>Variables</u>	<u>Leaders</u>		<u>Non-Leaders</u>	
	<u>Mn</u>	<u>SD</u>	<u>Mn</u>	<u>SD</u>
1st year GPA	2.54	.81	1.77	.76
Over-all GPA	2.54	.74	1.86	.74
HSR	80.10	16.18	63.23	22.07
MSAT	49.23	14.97	41.03	11.89
CET	188.84	90.77	144.37	26.70
STEP SS	49.58	8.39	43.80	7.60
HS Math Grade	5.46(C+)	2.92	3.91(C)	2.60
HS Eng. Grade	6.00(B-)	2.36	4.64(C+)	2.34
HS SS Grade	6.84(B)	2.15	5.15(C+)	2.52
HS NS Grade	5.45(C+)	2.31	4.32(C)	2.46
Number of HS activities	4.94	1.80	3.60	2.06
Number of HS offices	1.84	1.43	1.11	1.74
Number of hours of outside work in college	3.72	7.04	8.13	9.61
Hs (MMPI)	13.50	3.05	11.54	3.36
Hy (MMPI)	21.12	4.14	19.23	4.42
Pd (MMPI)	23.71	3.29	21.93	3.96
SVIB -				
Architect	24.77	7.60	28.40	9.55
Farmer	32.95	8.60	37.10	8.55
Aviator	29.83	9.31	34.05	9.85
Carpenter	24.06	7.61	32.94	9.52
Ind.Arts Teacher	14.38	6.70	22.82	8.81
Voc.Ag. Teacher	28.43	8.56	37.41	9.34
Forest Serv. Man	24.38	7.50	32.24	9.85
C.P.A.	39.06	9.11	30.94	8.72
Predicted G.P.A.	2.9	.50	1.82	.57

Discriminant function coefficients were computed for these variables, and from this equation predictions were made for the cross-validation sample (the same sample for which clinical predictions were made).

Of the 17 actual leaders in this sample, 13 were correctly classified by the discriminant function equation as leaders; and 78 of the non-leaders were correctly classified. Therefore, a total of 91 hits were made actuarially.

(It is noteworthy that when the discriminant function equation was applied to the entire sample of 200 upon which the equation was based, a total of 178 hits were recorded. The mean discriminant function score for the leader group was .0726 and the standard deviation was .0112. The mean and standard deviation for the non-leader sample was .0561 and .0087. The obtained F was 3.00, which with 25 and 174 degrees of freedom is significant at beyond the .001 level of probability.)

The next problem was to determine whether 91 hits was a significantly greater number than the mean number of hits for any of the counselor or non-counselor groups (Table 61). Using the chi square test, it was found that the actuarial number of hits was superior to the HS mean at the .02 level, and to the AC, SCB, and NC means at the .05 level of probability.

Therefore, these results suggested that predictions of leadership activity made actuarially were more efficient than the same predictions made clinically. It must be stated once again, however, that these were not actuarial predictions in a pure sense in that the cross-validation sample was part of the group that was used in computing the discriminant function equation.

The number of hits made actuarially was also compared with the base rate of 83 hits (if every study was predicted to be a non-leader). The obtained chi square was significant at the .10 level of probability.

Taken together, these results seem to indicate that differences between leaders and non-leaders can be identified and used for prediction purposes, as evidenced by the fact that this is exactly what happened with the actuarial predictions. However, counselors seem to have little knowledge about identifiable differences between these groups, or if they did, they certainly did not know how to weight them optionally (as in the discriminant function equation) to make predictions better than would be expected by chance. It may be possible, however, to train counselors to make this prediction more efficiently.

Finally, it should be stated that no effort was made to eliminate any of the 25 variables from the discriminant function equation. It is very probable that some variables could be dropped without seriously affecting the predictive efficiency. Only the preliminary results are reported at this time and the principal author expects to conduct continued research in this area. The results thus far obtained are very encouraging, and it may be that these findings will prove to have practical usefulness.

Predictive Accuracy of Individual Counselors

The records of the individual counselors for predicting campus leadership activity are listed in Table 63.

Table 64

Number of Hits for Each Counselor
in Predicting Campus Leadership Activity

Counselor No.	Condition			Mn		Counselor No.	Condition			Mn
	I	II	III				I	II	III	
HS 1	73	80	67	73		34	76	81	83	80
2	83	71	80	78		35	80	82	85	82
3	73	81	88	81		36	84	82	84	83
4	73	79	78	77		37	65	74	72	70
5	77	73	83	79		38	77	67	81	75
6	82	72	80	78		39	80	83	83	82
7	84	67	70	77		40	82	55	82	73
8	73	73	78	75		AC 41	73	82	82	79
9	82	80	80	81		42	79	75	75	76
10	84	81	80	82		43	84	81	82	82
11	83	80	77	80		44	80	80	78	79
12	82	83	83	83		45	83	78	85	82
13	76	87	82	82		46	85	83	80	83
14	83	83	84	83		47	85	82	83	83
15	85	80	81	82		48	82	83	83	83
16	70	82	81	78		49	80	71	84	78
17	83	83	83	83		50	75	82	82	80
18	80	75	84	80		51	85	83	83	84
19	84	73	84	80		52	73	80	89	81
20	77	84	81	81		53	81	82	85	83
21	79	82	87	83		54	79	81	83	81
22	83	83	83	83		SCB 55	80	80	83	81
23	74	76	81	77		56	82	80	84	82
24	85	79	83	82		57	81	76	81	79
25	82	79	74	78		58	80	79	79	79
26	73	71	88	77		59	83	83	83	83
27	83	77	80	80		60	83	74	71	76
28	74	82	81	79		61	84	80	80	81
29	82	79	87	83		62	83	82	83	83
30	83	84	86	84		63	83	83	84	83
31	89	81	87	86		64	81	83	83	82
32	81	80	84	82		65	81	85	82	83
33	85	82	83	83		66	83	85	86	81

High School Counselors: Numbers 1 thru 40

Arts College Counselors: Numbers 41 thru 54

Student Counseling Bureau Counselors: Numbers 55 thru 66

It was relevant to compare the predictive accuracy of the individual counselors with the same predictions made by the non-counselor group, with the base rate, and with the actuarial predictions.

In making these assessments, the mean number of hits for the three conditions was used for the individual counselors since the condition under which predictions were made did not affect the predicting accuracy for the counselor groups (Table 62).

In comparing the individual counselors with the non-counselors, the mean for the latter group was used. Table 61 showed this mean to be about 80, and the original aim was to determine which of the individual counselors were able to predict significantly more hits than this mean. Inspection of Table 63 shows, however, that the most number of hits recorded for any counselor was 86, which is not a significantly higher number of hits (.05 level) than the NC mean. Therefore, no counselors could be identified who predicted leadership better than the non-counselors.

As stated previously, the counselor and non-counselor groups alike predicted at about the chance level on the basis of knowledge that in any random sample of college students only a small proportion would be involved in leadership activities. Investigation of the individual counselors supports this conclusion in showing that not a single counselor was able to predict significantly better than the NC mean. Additional support comes from the fact that there was very little variability within the groups, with the standard deviations (Table 61) being quite small.

With most counselors obtaining mean hits very close to the base rate of 83, a comparison of the individual counselors with the base rate is meaningful only in supplying additional support to the conclusion already reached.

And further, none of the individual counselors came close to equalling the 91 hits correctly predicted from the discriminant function equation.

Estimated Weights Placed Upon Variables by
the Counselor and Non-Counselor Groups
in Making the Leadership Activity Predictions

Following the same procedure as was used with the achievement and "major" predictions, the counselors were asked to estimate how they were using the available case information to make their predictions of campus leadership activity. It was felt that the reader might have some interest in these data in spite of the fact that no significant differences were found among the counselor and non-counselor groups on their ability to make this particular prediction. Therefore, this information is provided only to reveal how the HS, AC, SCB, and NC groups typically used these variables in arriving at the leadership activity predictions, realizing that how these data were used by these groups was apparently not related to predictive accuracy.

Summary data for these 13 variables are listed in Table 65 for each of the counselor and non-counselor groups.

Table 65

Mean Percentages for Estimated Weights Placed Upon Variables*
by Each Group in Making Predictions of Campus Leadership Activity

Variables		HS Counselors				AC Counselors				SCB Counselors				Non-Counselors			
		Conditions				Conditions				Conditions				Conditions			
		I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.	I	II	III	Tot.
HSR	Mn	29.7	21.2	11.8	20.9	26.4	19.2	14.4	20.0	23.0	14.8	6.5	14.8	18.4	7.4	8.1	11.3
	SD	23.6	20.3	15.1	21.3	16.4	14.9	14.3	16.3	22.8	16.6	10.4	18.3	20.7	14.1	17.5	18.3
MSAT	Mn	18.8	15.5	9.0	11.4	23.3	18.2	14.0	18.5	14.1	11.1	5.8	10.3	18.7	14.1	3.8	12.2
	SD	17.3	15.0	12.0	15.1	13.9	13.1	13.0	13.9	15.9	13.0	9.3	13.2	18.8	19.6	9.8	17.8
CET	Mn	12.9	9.1	5.0	9.0	13.8	6.9	4.2	8.3	6.8	1.1	.1	2.7	17.5	9.6	5.5	10.9
	SD	14.4	10.9	8.0	11.9	12.0	9.7	7.6	10.7	13.3	4.4	1.8	9.3	22.3	15.6	15.5	18.8
HS Math Grade	Mn	3.5	1.6	.9	2.0	2.7	1.8	.8	1.8	1.0	.3	.1	.5	4.2	.8	.7	1.9
	SD	6.9	4.3	3.1	5.0	5.7	4.2	2.6	4.5	3.5	5.8	.7	2.4	9.6	3.2	3.4	6.4
HS Eng. Grade	Mn	4.6	2.4	1.4	2.8	3.1	1.6	.7	1.8	1.1	.4	.1	.5	5.0	2.1	1.5	2.9
	SD	7.6	5.1	3.9	5.8	5.8	3.9	2.6	4.4	3.8	1.8	.6	2.5	9.8	5.7	5.1	7.3
HS SS Grade	Mn	7.7	4.6	1.7	4.7	5.0	2.3	.8	2.7	3.5	1.8	.2	1.8	4.2	1.8	1.3	2.5
	SD	12.9	8.5	4.2	9.2	7.6	4.5	2.7	5.7	9.0	5.3	1.4	6.3	8.7	5.5	4.3	6.9
HS NS Grade	Mn	2.6	1.2	.6	1.4	2.4	1.5	.7	1.6	.9	.3	.1	.4	3.3	.8	.6	1.6
	SD	5.8	3.3	2.4	4.2	5.1	3.8	2.6	4.1	3.1	1.8	.6	2.1	8.0	3.2	2.8	5.3
STEP SS	Mn	9.2	6.2	3.2	6.2	11.1	6.4	2.1	6.6	5.4	3.1	.3	2.9	11.8	5.6	.7	6.0
	SD	15.0	10.9	7.5	11.8	12.8	8.7	5.0	9.0	10.0	7.1	2.2	7.6	17.9	12.9	3.2	13.7
SVIB	Mn	-	17.0	7.0	12.0	-	19.6	12.8	16.2	-	18.9	10.3	14.6	-	43.0	25.7	34.4
	SD	-	19.7	11.2	16.8	-	16.7	13.4	15.5	-	20.8	16.0	19.1	-	33.1	21.7	27.4
MMPI	Mn	-	15.2	9.2	12.2	-	15.6	11.1	13.3	-	23.2	13.9	18.6	-	1.7	1.0	1.4
	SD	-	20.7	14.1	18.0	-	13.4	11.4	12.2	-	20.8	15.1	18.0	-	8.7	5.1	7.2
Biog. Info.	Mn	-	-	46.1	46.1	-	-	34.5	34.5	-	-	46.5	46.5	-	-	44.9	44.9
	SD	-	-	25.3	25.3	-	-	24.4	24.4	-	-	28.0	28.0	-	-	40.0	40.0
Stat. Info.	Mn	-	-	1.6	1.6	-	-	2.0	2.0	-	-	2.9	2.9	-	-	.7	.7
	SD	-	-	5.9	5.9	-	-	5.6	5.6	-	-	2.5	2.5	-	-	2.3	2.3
Other	Mn	14.2	9.4	5.0	9.5	13.5	9.0	5.2	9.2	43.5	17.7	12.0	24.4	20.0	12.6	4.9	12.5
	SD	29.6	23.6	12.6	23.3	30.9	23.7	11.6	21.6	35.7	26.3	20.3	31.3	28.0	28.5	17.5	25.9

*Blank spaces indicate that the particular variable was not available for that condition.

Inspection of this table reveals a number of fairly sizeable differences among these groups on the weights typically placed upon certain of these variables. Some of the more noticeable differences were for HSR, the SVIB, the MMPI, biographical information, and the "other" category.

The "other" variable served as a catch-all for other factors that were considered in making predictions in addition to the 12 variables that were actually specified. In making leadership activity predictions, counselors often used personal knowledge about high schools such as their size and location. This was particularly the case under condition I where little information was available pertaining directly to leadership. Therefore, some counselors hunched, for example, that a student from a very small high school located in northern Minnesota was less likely to become a leader than a graduate from a large Minneapolis high school. As more information was made available, the weight tended to shift to particular variables, and this is especially noticeable for condition III. Much of the weight for that condition was placed upon the biographical information. However, as Table 61 indicated, there was little change in the accuracy of these predictions.

The fact that there was considerable disagreement among these groups, counselors and non-counselors alike, seems to underscore the confusion and uncertainty in the minds of those who were trying to predict leadership activity.

Chapter VII

CONCLUSIONS AND IMPLICATIONS

The following conclusions appear warranted from the results presented in this investigation:

I. Academic Achievement Predictions

1. Counselors who worked in different settings were found to differ in their ability to predict whether students would earn "C or better" or "less than C" grades for both first-year and over-all college grades. SCB counselors, who have the opportunity to counsel with students at all collegiate levels, were found to predict more efficiently than high school counselors or the advisors of freshmen and sophomores in the Arts College. All of the counselor groups were able to predict hits for first-year grades more efficiently than the non-counselors included in this study, but only the SCB group was superior to the NC group on hits for over-all college grades. However, no differences were found among the counselor and non-counselor groups on correlation coefficients for first-year or over-all college grades. One explanation why no differences were found on the r 's seemed to be that the non-counselors were able to predict with greater efficiency than expected.
2. Predictive efficiency was not affected by the varying amounts of case information available to the counselors. That is, additional case data neither increased nor decreased predictive accuracy.

3. The reliabilities for predictions of both first-year and over-all college grades were consistently high for the various conditions under which predictions were made. This was true for the counselors and non-counselors alike.
4. The actuarial predictions were superior to the predictions made by any of the groups of clinical judges. This was found from the assessments of hits and correlation coefficients for both first-year and over-all college grade predictions.
5. The superiority of the actuarial predictions was such that even when the clinical predictions of counselors were studied individually, no counselors could equal the actuarial predictions when all of the predictor variables were included in the regression equation. A few counselors were able to equal the actuarial predictions, however, when only HSR and MSAT were included in the prediction equation. Also, while only a few individual counselors predicted achievement significantly better than the average non-counselor, most counselors were at least able to equal the base rates for the first-year and over-all college grade predictions.
6. The results of this study are clear in showing that an institutional type of prediction such as the predictions of grades for a group of students can be made more efficiently by actuarial methods than counselors and naive judges can make through clinical predictions. Over the long run the use of a regression equation, which weights variables optimally, will produce more accurate predictions.

7. The amount of counselor experience per se does not appear to be related to predictive efficiency. The predictive accuracy of individual counselors is not independent of where the experience was acquired. The fact that AC counselors with little experience and almost no formal counselor training were among the most efficient at making predictions of first-year hits suggests that predictive efficiency can be rather quickly learned on the job through informal training. Some evidence was found, however, that predictive accuracy was linearly related to amount of experience within the SCB and HS groups.
8. Counselors expressed degree of confidence in their predictions was significantly related to predictive accuracy when both "C or better" and "less than C" predictions were considered. They were more often correct for predictions in which they were most confident than for predictions in which they expressed least confidence. This was true for both first-year and over-all college grade predictions.
9. For the predictions of "C or better", counselors expressed degree of confidence was significantly related to predictive accuracy, being more accurate for cases in which they were most confident than in cases in which they were least confident. However, for the counselor predictions of "less than C", no significant relationship was found between counselors' confidence and predictive accuracy. Although no significant relationship was found between degree of confidence and predictive accuracy for the "less than C" predictions, these predictions were actually more accurate

than the "C or better" predictions for first-year grades. The explanation offered for these results took into account the base rates, which deviated considerably from the pass-fail rates used by counselors.

10. Some evidence was found suggesting that individual counselors who were typically most confident about the accuracy of their predictions were actually less efficient than counselors who expressed least confidence about the correctness of their predictions. It can be definitely concluded that the most confident counselors did not predict more efficiently than the least confident counselors. Expressions of confidence may reflect counselor personality characteristics more than anything else.
11. Counselors who rated themselves as only average on general counseling effectiveness obtained a greater mean number of hits for the first-year predictions than did counselors who rated themselves as above average. No differences were found between them on the hits for over-all college grade predictions. Therefore, it can be concluded with certainty that counselors who rated themselves highly did no better on these predictions than counselors who rated themselves as average.

If only the evidence for hits for first-year predictions is considered, counselors who rated themselves as average on general counseling effectiveness and/or who lacked confidence in their judgments tended to predict more efficiently than counselors who rated themselves highly in effectiveness and/or

who expressed much confidence in their predictions. However, all differences found between the counselor groups for the over-all college grade predictions were less dramatic than the differences found for first-year grades, which seemed to reflect confusion and uncertainty in the minds of the counselors in making the over-all prediction.

12. Counselors who predicted academic achievement with the greatest accuracy tended to use an implicit "regression equation" in arriving at their predictions. However, predictive efficiency cannot be separated from knowledge of what is being predicted, and the use of an "equation" does not automatically result in greater efficiency. The expressed use of an "equation" is not in itself enough to make predictions more accurate.
13. There was considerable agreement among the HS, AC, and SCB counselors on the estimated weights typically placed upon the case variables in making predictions of academic achievement. Most weight was consistently placed upon the HSR and MSAT variables. The non-counselor group typically placed less importance on these two variables.
14. The counselors who predicted with the greatest efficiency typically placed more importance upon HSR and MSAT than the counselors who predicted with least efficiency. The high accuracy counselors weighted these two variables more in line with the optimal weights determined statistically through multiple regression.

The fact that the low accuracy counselors apparently used the case information inappropriately suggested that perhaps counselors can be taught how to make predictions more efficiently.

15. The counselors who predicted with the greatest accuracy obtained significantly higher scores on an analogies test than counselors who predicted with least accuracy, which suggests that the former group was better able to understand and deal with abstract concepts. This seems to be related to the use of "constructs" in prediction making. Further, the high accuracy group was more compulsive, a characteristic which might also be of significance in the building of mental "constructs". No differences were found between the high and low accuracy counselors on biographical information obtained from a questionnaire.
16. The amount of time spent by counselors in making their predictions was not related to predictive efficiency.

II. "Major" Predictions

1. There were differences among the HS, AC, SCB, and NC groups in predicting whether students would be successful in the major programs they selected upon admission to the University. The SCB group was superior to the other groups in making this prediction, with the AC, HS, and NC groups ranked next in order of predictive efficiency. Probably one of the most important reasons the SCB group was better at making this prediction was because of their greater opportunity to counsel with students at all educational levels, thereby increasing their knowledge of significant factors

related to the various kinds of educational programs. A second reason seemed to be that an analogies test showed that the SCB counselors were superior to the other groups in handling abstract concepts, which seems to be related to the use of hypothetical constructs in prediction-making.

2. The amount of case information that counselors had available did not affect their predictive accuracy. That is, predictions based upon students' ability test scores and past high school scholastic achievement were not more or less accurate than other predictions where counselors had considerably more case information available.
3. Counselors were very inconsistent in the use of case information in making predictions, which suggested that counselors approached each case individually. There was definitely no evidence that counselors tried to make these predictions using the same implicit "regression equation".
4. There were wide differences among individual counselors in their ability to make this prediction. Twelve counselors predicted significantly more hits than the mean for the non-counselor group, and fifteen counselors predicted no better than the mean for the non-counselors.
5. The amount of counseling experience per se does not seem to be related to efficiency in making this prediction. Rather than the amount of experience, what seemed to be of greater importance is where the experience was acquired. Obviously enough, having the opportunity to work with certain kinds of students adds to one's skill in dealing with the problems of those particular students.

6. There is indirect evidence that counselors can be taught how to make efficient predictions. Arts College counselors received less formal training than any of the other counselor groups and yet five of these counselors were among the top twelve counselors at making this prediction. Furthermore, Arts College counselors with two years or less counseling experience were, as a group, among the most efficient prediction-makers. Because of having received little or no formal counselor training in addition to being relatively inexperienced, this skill probably resulted from informal training.
7. Counselors who were typically most confident about their "major" predictions were significantly less accurate than counselors who typically were least confident about their predictions. There was considerable consistency among counselors in their willingness to express much or little confidence in their "major" predictions and predictions of academic achievement.
8. Counselors who rated themselves highly on general counseling effectiveness definitely did not make the "major" predictions (or any other predictions) more efficiently than did counselors who rated themselves as average. Actually, the trend for the various predictions was for "average" counselors to do slightly better than the "above average" counselors; and in one case--for predictions of first-year grades--the "average" counselors predicted significantly better.
9. Practically speaking, there was considerable similarity on the weights (or importance) typically placed upon the case variables

by the HS, AC, and SCB counselors in making the "major" predictions. However, practical differences did show up on several variables, particularly on the SVIB and on the biographical information.

10. Counselors who rated among the top twelve at making the "major" predictions also tended to rate among the counselors most accurate at making predictions of academic achievement. Consistency was also found in regard to counselors who were least efficient.
11. There was considerable similarity between the high and low accuracy counselors on the weighting of case variables used in making "major" predictions. The primary exception was the SVIB, where the most efficient counselors weighted this variable more heavily than did the least efficient counselors.
12. Counselors who were most efficient at making the "major" predictions were intellectually superior to the least efficient counselors in handling analogies (abstract concepts), and they also had stronger needs for achievement and autonomy. Evidence was also found suggesting that the most efficient counselors were more compulsive, which corroborates the results found for the predictions of academic achievement. Thus, a combination of personality factors appears to be related to counselor predictive efficiency. No differences were found between the most and least efficient counselors on the biographical information that was collected.

III. Leadership Activity Predictions

1. There were no differences among the counselor and non-counselor groups on their ability to predict campus leadership activity for students, with all of these groups predicting at about the chance level on the basis of knowledge that only a small proportion of the students would actually become leaders. The mean number of hits for each of these groups was close to the base rate. The amount of case information available to counselors had relatively little effect upon predictive efficiency.
2. Counselors seemed unable to make this prediction effectively because they had never previously attempted to make differentiations between leaders and non-leaders; and they were poorly informed about what factors were significantly related to the construct they were trying to predict. Also, the definition of leadership used in this study might have been too broadly defined.
3. Predictions of leadership activity made actuarially were superior to the clinical predictions of any of the counselor and non-counselor groups. However, these were not actuarial predictions in the pure sense in that the cross-validation sample for which predictions were made was also a part of a larger sample used in computing the discriminant function equation. Yet these results offer very positive evidence suggesting that such a prediction can be made effectively through actuarial techniques.
4. No individual counselors were identified who made the leadership activity predictions significantly better than the average non-counselor, which offers additional evidence that counselors were

not very skillful at making this prediction. No single counselor predicted more efficiently than the base rate, and no counselor came close to equalling the number of hits made from the discriminant function equation.

5. Although no significant differences were found among the counselor and non-counselor groups on their ability to make this prediction, a number of fairly sizeable differences were found among them on the way they typically used the case information in arriving at their predictions. Possibly this reflected confusion and uncertainty about the construct of leadership they were trying to predict.

Implications

If the question is which method, actuarial or clinical, provides the more efficient predictions of academic achievement for a group of students (an institutional prediction), the results of this study corroborate the findings of previous research in showing that the actuarial method is superior. The determination of optimal weightings for variables through statistical procedures and the application of these weights will result in the long run in more accurate predictions than from predictions made clinically.

It appears that the average clinical judge simply cannot determine what the optimal weights for variables should be and there seems to be several reasons for this. One of the most important is that clinical judges often are not knowledgeable enough about the criterion being predicted. An understanding of the criterion construct is perhaps the most fundamental principle in making clinical predictions efficiently. But even if the clinical judge

is thoroughly familiar with the criterion he still has to know when to deviate from the "usual" prediction (that is, when to take into account a relevant but unusual piece of case information) in order to beat the actuarial method. This is probably asking more of the clinical judge than he is capable of doing, although the results of this study suggest that a few judges might potentially be able to do this. This is certainly an interesting possibility.

One of the more fascinating research possibilities from these data is to determine what effect additional rigorous training on the criterion would have upon the most efficient counselors in attempting to beat the actuarial method. The counselors who participated in this study received no special training and, in fact, this probably was the first time that most of them had thought about cases in exactly the same way as was required in this investigation. Perhaps clinical judges need experience in doing this task in much the same way as a criterion group is used to develop a regression equation that is then used with a cross-validation sample.

However, unless it can be shown that certain clinical judges can be trained to beat the regression equation, the actuarial method must be used. Equalling the actuarial method is not sufficient reason for clinical predictions to be used since using the regression equation is much cheaper and more economical. This argument applies primarily to the institutional type of prediction.

Not all predictions, of course, are of the institutional type, but are more concerned with the particular individual in a clinical sense where a prediction equation cannot be directly computed. In this case many predictions that are made must of necessity be of the clinical type. Since

almost all counselors make this type of prediction frequently (if not explicitly, then implicitly), further research might reveal that counselors can be taught to build more adequate case constructs that can be used in making predictions about individuals.

The results found in this study for the "major" predictions were encouraging in revealing that individual differences among counselors can be identified as to their ability to make this prediction. This was in spite of the fact that this was a difficult sample of students to predict because of the wide diversity of educational plans. Nevertheless, these findings indicated that there are differences among counselors in their ability to sift through case information in determining whether a given student's plans appear appropriate.

It cannot be argued that the counselors who can do this most efficiently are automatically the counselors who do the best job of counseling. It does seem reasonable, however, that the counselor who can do this best is in a more favorable position to do a good job of counseling than another counselor who cannot put together case information to form a "person" that can then be used to determine whether a given student's plans seem appropriate. Actually, this requires that the counselor not only build the "person" but, in addition, he must have knowledge about what it takes to make it through the program the student has selected and, better still, he must have knowledge about what it takes to be successful on the job.

These findings also have implications for teaching purposes. Since counselors seem to differ not only in their ability to make this type of prediction but also in the case material used, it may well be that counselors

can be taught to use case information more effectively. More research is planned that is concerned with this particular prediction.

The counselor predictions of campus leadership activity were made with very little knowledge about the criterion being predicted and, as a result, were about as efficient as would be expected by chance. However, it is significant that the results of this study showed that there are identifiable differences between campus leaders and non-leaders. Furthermore, it seems very probable that actuarial methods can be used to classify students efficiently into leader and non-leader groups. This definitely seems to offer practical usefulness in early identification of new students who are interested in becoming involved in campus leadership activities.

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APPENDIX A

LETTERS TO COUNSELORS

June 17, 1963

Dear _____ :

The U. S. Office of Education has recently made available a sizeable grant to support a research project at the Student Counseling Bureau of the University of Minnesota dealing with the college-bound high school student. We hope that the results of this study will provide important and useful information for counselors like yourself. In order to complete this study, it will be necessary for us to obtain the cooperation of counselors who normally function in a variety of settings. Your name has been selected at random from a list of high school counselors as a possible participant in this study.

Your participation in the study would involve making decisions and predictions that you normally make in counseling with college-bound students. Specifically, you would be asked to make predictions from psychometric and biographical information about such things as the probability that students will be academically successful in college and the appropriateness of majors they have selected. Essentially, we are interested in finding more effective methods for helping young people make decisions about college.

If you would be willing to participate in this study, we will be able to pay you an honorarium of \$100. It would be necessary for you to come to the Student Counseling Bureau for about three to five days sometime between July 15th and August 31st. The amount of time spent here would depend on how long it took you to complete the tasks involved.

June 17, 1963

We know that many of you will be very busy this summer and will be unable to spend three to five week-days on this project. In order that it would still be possible for you to participate, special sessions will be arranged in the evenings and on weekends. In addition to the time spent here, several inventories and a questionnaire will be sent to you that can be completed at home, as we are also interested in studying counselors' personalities in relation to the predictions they make.

Let me emphasize that participation in this project will be completely anonymous. In no way will your identity be revealed.

A card is enclosed on which you can indicate whether you would be interested in participating. More information about the project will be supplied later. If you think you might be interested but have further questions at this point, you can write or telephone me (373-4193 or 373-4194) at the Student Counseling Bureau.

Your prompt reply will be greatly appreciated.

Sincerely,

Donivan J. Watley, Ph.D.
Assistant Professor

DJW/jm

Enclosure

UNIVERSITY OF *Minnesota*

OFFICE OF THE DEAN OF STUDENTS
STUDENT COUNSELING BUREAU • MINNEAPOLIS, MINNESOTA 55455

July 5, 1963

Dear _____ :

Since you indicated that you are interested in participating in our study, I will give you a bit more information about the project and the kinds of things we will ask you to do.

First, we will mail you three inventories and a questionnaire that can be completed at home. The inventories are the Strong Vocational Interest Blank (Men's Form), the Edwards Personal Preference Schedule, and the Minnesota Multiphasic Personality Inventory. However, if you have taken any of these inventories within the past two or three years we could use those results and you could avoid taking these again. If you have not taken these inventories, or wish to take them again, we will be happy to supply you with copies of your results.

The questionnaire asks for information about your educational background, counseling experience, etc.

We would also like to have for each of you the results of the Miller Analogies Test. Since most of you have taken this test, it will again be a matter of obtaining the results. Please indicate on the enclosed card whether this test has been taken. If there are any of you who have not yet taken this test, we can arrange for you to take it here.

The tasks to be completed here at the Student Counseling Bureau involve your making decisions and predictions that you might make in counseling with college-bound students. We will ask each counselor to make predictions on 375 case folders, with the folders containing various amounts of psychometric and biographical information. Each counselor will be asked to work at his own pace in making these predictions, which makes it impossible to determine the exact amount of time to be spent here. I am sure that the total amount of time spent on these tasks will vary widely from one counselor to the next. Some may finish in 25 hours while some may need as much as 40 hours.

Many of you have indicated that you would prefer working in the evenings and on weekends. This will be fine. Whatever your plans happen to be, would you please give us some idea about when you can come here. You can indicate this on the enclosed card. This will help us greatly in arranging our schedule, and assure that someone will be here when you show up.

We realize that much of the information we would like from you is of a very personal nature. I would like to reassure you that your participation in this project will be completely anonymous, and that your name will be immediately removed from any information obtained from you and replaced with a code number.

In addition to high school counselors, other groups of participants in the project are Student Counseling Bureau counselors, counselors from the Lower Division Advising Office of the College of Science, Literature, and the Arts, and a group of college students with no background at all in counseling. All will be asked to complete the same tasks. Thus, counselors from several settings, with a variety of education backgrounds and experiences will participate in this project.

Please fill in the enclosed card and return it promptly. This will enable us to determine which inventories should be sent to you along with the questionnaire, or how we can obtain the results of tests already taken. Also, please be as specific as you can about the dates and times that will be most convenient for you to come to the Student Counseling Bureau.

Sincerely,

Donivan J. Wetley, Ph.D.
Assistant Professor of
Educational Psychology

University of Minnesota
Office of the Dean of Students
Student Counseling Bureau

July 17, 1963

Memorandum

To: LDAO Counselors

From: Donovan J. Watley, Project Director

Re: Participation in research project

The U.S. Office of Education has recently made available a sizeable grant to support a research project at the Student Counseling Bureau dealing with the college-bound high school student. In order to complete this study, it will be necessary for us to obtain the cooperation of counselors who normally function in a variety of settings. In addition to LDAO counselors, other groups of participants in the project are Student Counseling Bureau counselors, high school counselors, and a group of college students with a variety of educational backgrounds and experiences.

If you would be willing to participate in this study, we will be able to pay you an honorarium of \$100. It would be necessary for you to come to the Student Counseling Bureau for about three to five days.

The tasks to be completed here at the Student Counseling Bureau involve your making decisions and predictions that you might make in counseling with students. We will ask each counselor to make predictions on 375 case folders, with the folders containing various amounts of psychometric and biographical information. Each counselor will be asked to work at his own pace in making these predictions, which makes it impossible to determine the exact amount of time to be spent here. I am sure that the total amount of time spent on these tasks will vary widely from one counselor to the next. Some may finish in 25 hours while some may need as much as 40 hours.

It is hoped that you would find it possible to begin sometime during the week of July 22nd. However, we know that some of you will be unable to spend three to five week-days on this project. In order that it would still be possible for you to participate, special sessions will be arranged in the evenings and on weekends. In addition to the time spent here, several inventories and a questionnaire will be given to you that can be completed at home, as we are also interested in studying counselors' personalities in relation to the predictions they make. However, it is very probable that most of you have already taken these inventories and it would be a matter of obtaining the results.

Let me emphasize that participation in this project will be completely anonymous. In no way will your identity be revealed. Your name would be immediately removed from any materials obtained from you and replaced with a code number.

If you are interested in participating in this study, please telephone me at the Student Counseling Bureau (ext. 4193 or 4194). I would be glad to answer any other questions that you might have in relation to this project.

Donivan J. Watley, Ph.D.
Assistant Professor of Educational
Psychology

APPENDIX B

COUNSELOR QUESTIONNAIRE

RESEARCH QUESTIONNAIRE FOR COUNSELORS

Directions for completing questionnaire: In the following pages you will find questions asking for information of two general types. One type requests detailed information of an historical nature, and includes some questions about your current status. The other type asks for a more introspective type of information pertaining to the counseling field and your day-to-day functioning as a counselor. This latter type can be answered by placing a check-mark by the answer you choose.

Some of the questions about your educational background are of such a specific nature that it will be necessary for you to look up your college transcripts for the answers. Please take time to do this as the nature of the experiment requires accurate answers.

Please fill in the following blanks of this cover sheet. When the completed questionnaire has been received from you this sheet will be removed and the remainder of the pages assigned a code number. Only the project director will know whose questionnaire it is. DO NOT WRITE YOUR NAME ON ANY OF THE OTHER PAGES.

NAME _____
 First Middle Last

PRESENT EMPLOYMENT _____
 School Location

Donivan J. Watley
Student Counseling Bureau
University of Minnesota

Code Number _____

PERSONAL DATA

1. Age at last birthday _____

2. Sex: _____ Male; _____ Female

3. Current marital status:

A. _____ Single (never married) _____ Widowed
_____ Married _____ Separated
_____ Divorced

4. How many brothers and sisters do you have (living and deceased):

_____ Am only child _____ Older sisters
_____ Older brothers _____ Younger sisters
_____ Younger brothers

5. Parents education (check the highest level for each parent):

	Mother	Father
8th grade or less	_____	_____
Some high school	_____	_____
High School graduate	_____	_____
Technical, business, etc.	_____	_____
Some college	_____	_____
College graduate	_____	_____
Some graduate or professional work	_____	_____
Received advanced degree	_____	_____

6. Parents occupations while you were in college (If deceased or retired while you were in college, make this notation and give occupation before death or retirement; e.g., "Deceased - high school teacher"):

Father's occupation _____

Briefly describe his duties _____

Mother's occupation _____

Briefly describe her duties _____

7. Religion:

A. Religion in which you were reared:

☐ Protestant
☐ Roman Catholic
☐ Jewish
☐ Other (specify) _____
☐ None

B. Your present preference:

☐ Protestant
☐ Roman Catholic
☐ Jewish
☐ Other (specify) _____
☐ None

EDUCATION

8. High school from which you graduated:

A. Location: Town or city _____, State _____

B. Year of graduation _____

C. Type of high school: ☐ public, ☐ private

D. Size of high school graduating class:

☐ 500 or larger
☐ 250 - 499
☐ 100 - 249
☐ 50 - 100
☐ less than 50

E. Community in which you lived while attending high school:

☐ Urban - city of 100,000 or larger
☐ Suburban - suburb of city of 100,000 or larger
☐ Suburban - suburb of city of less than 100,000
☐ Non-suburban city of 10,000 to 100,000
☐ Town of 2,500 to 10,000
☐ Town of less than 2,500
☐ Farm or open country

9. College Education:

A. Colleges attended	Major	Minor	Inclusive years attended	Degree and year obtained
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

- B. Number of undergraduate and graduate credits earned in measurement and statistics courses (be fairly rigid about courses included):

____ less than 10 quarter hours
____ 10 - 25 quarter hours
____ 26 - 40 quarter hours
____ 41 - 55 quarter hours
____ 56 or more quarter hours

- C. What was the average grade earned in the above courses? (Based on grading system: A = 4, B = 3, C = 2, D = 1, F = 0.)

____ 3.5 - 4.0 GPA
____ 2.8 - 3.4 GPA
____ below 2.7 GPA

- D. Number of undergraduate and graduate credits earned in counseling courses (e.g. theory, methods, etc., in most cases "counseling" or "guidance" should appear in the course title)

____ less than 10 quarter hours
____ 10 - 25 quarter hours
____ 26 - 40 quarter hours
____ 41 - 55 quarter hours
____ 56 - 70 quarter hours
____ 71 or more quarter hours

- E. What was the average grade earned in the above courses? (Grading system same as above)

____ 3.5 - 4.0 GPA
____ 2.8 - 3.4 GPA
____ below 2.7 GPA

- F. Number of undergraduate and graduate credits earned in courses of a psychology nature not already counted as measurement, statistical, or counseling (e.g. individual differences, psychology of learning, psychology of motivation, etc.)

____ less than 10 quarter hours
____ 10 - 25 quarter hours
____ 26 - 40 quarter hours
____ 41 - 55 quarter hours
____ 56 or more quarter hours

G. What was the average earned in the above courses? (Grading system same as above)

____ 3.5 - 4.0 GPA
____ 2.8 - 3.4 GPA
____ below 2.7 GPA

H. Which of these honors or awards did you receive during college? (check any which apply_

____ Dean's list (for high scholarship)
____ Phi Beta Kappa
____ Other honor society based on academic achievement
____ Graduation with honors (Cum, Magna, Summa, "with distinction")
____ Scholarship awarded on the basis of academic ability
____ Honor society based on leadership
____ Participation in "honors program"
____ Prize or award for scholarship or research work
____ Prize or award for literary, musical, or artistic work
____ Other award or honor (specify)_____

ACHIEVEMENTS AND HONORS

10. Please indicate your achievements or honors you have won, and total the number in each category:

	Total Number
____ Fiction articles and books published	_____
____ Technical articles and books published	_____
____ Other non-fiction articles and books published	_____
____ Other publications of any kind	_____
Specify_____	
____ Professional awards (Counseling, teaching, etc.)	_____
____ Business awards	_____
____ Civic awards	_____
____ Other awards	_____
Specify_____	

ORGANIZATIONS AND ACTIVITIES

11. In which of the following organizations are you an active participant, and about how many hours per month on the average do you spend with each activity? (check any that are applicable and indicate number of hours)

Organizations	Hours/Month
____ Professional (APGA, MCA, TCVGA, etc.)	_____
____ Business (Chamber of Commerce, etc)	_____
____ Civic and community (Scoutmaster, etc.)	_____
____ Service clubs (Rotary, Lions, etc.)	_____
____ Political (DFL, GOP, etc.)	_____
____ Lodges (Elks, IOOF, Masons, etc.)	_____
____ Charitable (YMCA, United Fund, etc.)	_____
____ Religious	_____
____ Recreational (Bridge, Drama, etc.)	_____
____ Other	_____

Specify _____

12. About how many books would you say you have read in the last 12 months? (check one answer for each)

Technical		Non-technical
_____	None	_____
_____	1 - 5	_____
_____	6 - 10	_____
_____	11 - 20	_____
_____	21 - 40	_____
_____	41 or more	_____

13. About how many books would you estimate you own? (check one answer for each)

Technical		Non-technical
_____	None	_____
_____	1 - 5	_____
_____	6 - 10	_____
_____	11 - 20	_____
_____	21 - 40	_____
_____	41 or more	_____

14. About how many books do you buy in a typical 12-month period? (check one answer for each)

Technical	None	Non-technical
_____	1 - 5	_____
_____	6 - 10	_____
_____	11 - 20	_____
_____	21 - 40	_____
_____	41 or more	_____

QUESTIONS RELATED TO COUNSELING

15. List in chronological order your employment record as a counselor

Inclusive dates	Employer and Location	Percentage of time counseling
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

16. Membership in professional organizations (check as many as apply):

____ American Personnel and Guidance Association (APGA)
 In how many divisions are you a member? _____

____ American Psychological Association (APA)
 In how many divisions are you a member? _____

____ Minnesota Counselors Association (MCA)

____ Minnesota Psychological Association (MPA)

____ Twin Cities Vocational Guidance Association (TCVGA)

____ Others _____
 Specify _____

17. Is your behavior as a counselor generally influenced by a particular philosophy of counseling? ____yes, ____no.

If yes, briefly label or describe your philosophy _____

APPENDIX C

INFORMATION GIVEN TO JUDGES

Directions for Counselors Making Predictions

Participation in this project calls for your making essentially three kinds of predictions for 375 cases: (1) predictions of academic achievement; (2) predictions about appropriateness of educational goals; and (3) predictions of campus leadership activity. In addition to the predictions you make, we also want to know how confident you are in each prediction and the estimated importance (weight) you place on the information available to you in making the prediction.

You have been assigned a code number by the project director. Please use this number as your identification on all answer sheets.

In each case folder you will find answer sheets on which all of your responses should be made. After answering all of the questions about a case, check to see that your code number is on the first answer sheet, and then put the answer sheets back in the folder.

You will be asked to make very precise responses. We know this is difficult but do the best you can. We have to get precise information from you in order to find out how you go about arriving at your predictions.

For those questions that range on a continuum (e.g., from "very confident" to "not at all confident") place a check-mark anywhere along the line that you think is appropriate.

After you have completed answering all the questions about a case, please do not refer back to that case at a later time to check or change any of your answers. Each folder should be considered independently.

Work at your own pace in making your predictions. If you get tired, take a rest. If you get too weary, come back another day.

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LEADERSHIP DEFINITION

This definition has the connotation of both seeking out and acquiring campus leadership, which is based on the assumption that there must first be some desire before actual leadership activity follows. Since the kind of leadership in which we are interested is competitive, these positions must be sought (e.g., elected offices in student government, fraternities, etc.). We want you to predict for each person the extent to which he will seek out and acquire leadership.

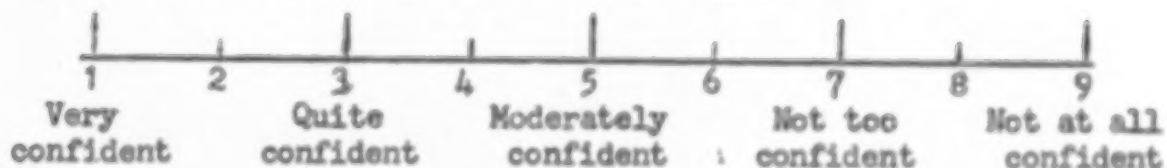
Case No. _____

Counselor Code No. _____

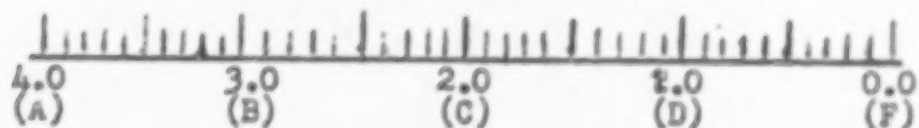
Based on the information available to you in this folder, please make the requested predictions and answer the related questions.

1. A. Do you think this student will finish the freshman year in SLA? ____yes, ____no

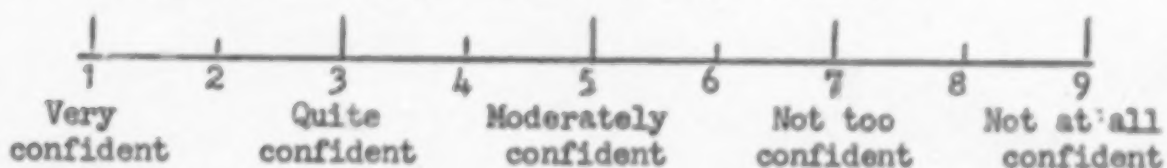
B. How confident are you in the above prediction?



2. A. Predict the GPA he will earn during the freshman year:



B. How confident are you in the above prediction?



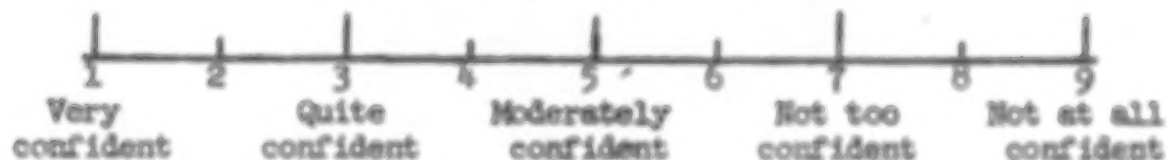
C. Estimate the weight (in percentages) you placed on the data given to you in predicting first year GPA:

_____% + _____% + _____% + _____% + _____% + _____% + _____% +
HSR MSAT Eng Coop HS Math HS Eng HS Soc HS Natr'l
Grade Grade Stu Gr Sci Grade

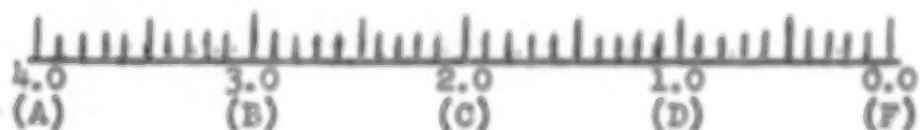
_____% + _____% + _____% + _____% + _____% + _____% = 100%
STEP SVIB MMPI Biograph Statistical Other
S S Info Info

A. Will he graduate from college? yes, no

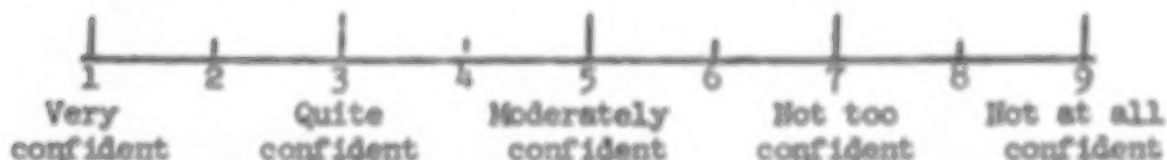
B. How confident are you in the above prediction?



A. Predict the over-all GPA he will get in college:



B. How confident are you in the above prediction?



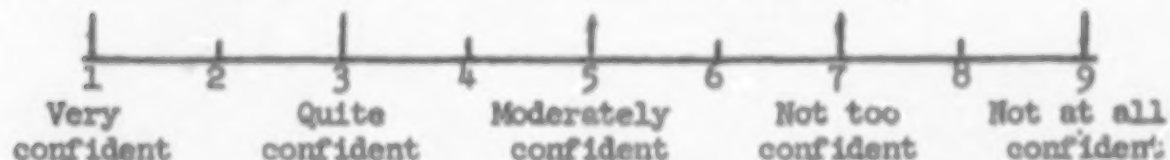
C. Estimate the weight (in percentages) you placed on the data given to you in predicting over-all GPA:

 % + % + % + % + % + % + % +
HSR MSAT Eng Coop HS Math HS Eng HS Soc HS Natr'l
Grade Grade Stu Gr Sci Grade

 % + % + % + % + % + % = 100%
STEP SVIB MMPI Biograph Statistical Other
S S Info Info

A. Do you think this student will remain in the major program he has selected? yes no

B. How confident are you in the above prediction?

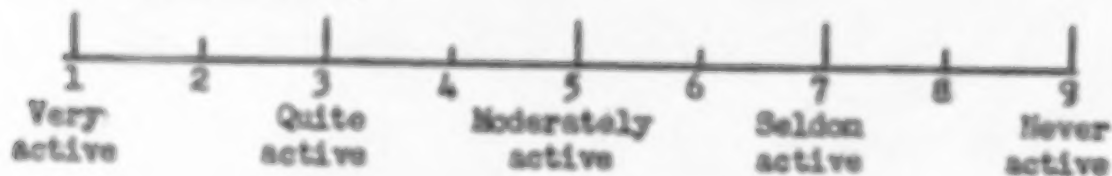


C. Estimate the weight (in percentages) you placed on the data given to you in predicting whether this student will remain in his major program:

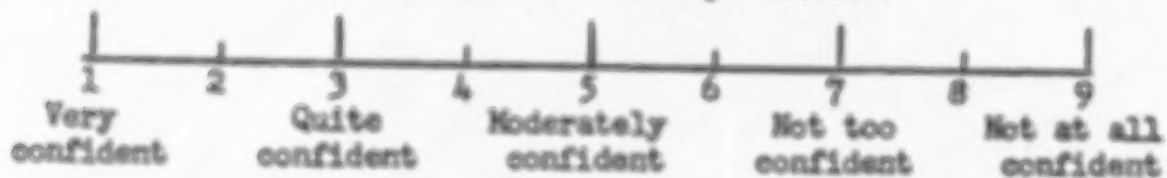
 % + % + % + % + % + % + % +
HSR MSAT Eng Coop HS Math HS Eng HS Soc HS Natr'l
Grade Grade Stu Gr Sci Grade

 % + % + % + % + % + % = 100%
STEP SVIB MMPI Biograph Statistical Other
S S Info Info

5. A. Predict the extent to which this student will be active in seeking out and acquiring campus leadership:



B. How confident are you in the above prediction?



C. Estimate the weight (in percentages) you placed on the data given to you in predicting leadership activity:

<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %
HGR		NSAT		Eng Coop		HS Math Grade		HS Eng Grade		HS Soc Stu Gr		HS Matr'l Sci Grade
<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %	+	<u> </u> %	= 100%	
SEP S S		SVIB		WPI		Biograph Info		Statistical Info		Other		

STUDENT COUNSELING BUREAU
OFFICE OF THE DEAN OF STUDENTS
UNIVERSITY OF MINNESOTA

PRODUCTS OF REGRESSION WEIGHTS AND HIGH SCHOOL GRADES
TO BE ENTERED IN REGRESSION EQUATION TO PREDICT FRESHMEN GPA FOR SLA MALES

HIGH SCHOOL GRADES

ENGLISH

MATH

SS

NS

PRODUCT OF HIGH SCHOOL GRADE AND REGRESSION WEIGHTS

<u>HIGH SCHOOL GRADE</u>	<u>ENGLISH</u>	<u>MATH</u>	<u>SS</u>	<u>NS</u>
4	.9368	.5472	.8876	.6216
3	.7026	.4104	.6657	.4662
2	.4684	.2736	.4438	.3108
1	.2342	.1368	.2219	.1554
0	.0000	.0000	.0000	.0000

CALCULATION OF PREDICTED GPA

$$\frac{\text{ENGLISH}}{\text{ENGLISH}} + \frac{\text{MATH}}{\text{MATH}} + \frac{\text{SS}}{\text{SS}} + \frac{\text{NS}}{\text{NS}} - \frac{.0553}{\text{CONSTANT}} = \frac{\text{PREDICTED GPA}}{\text{PREDICTED GPA}}$$

$$R = .60$$

$$SE_m = .598$$

Expectancy tables for first year
Grade-Point Average Based on
Freshmen Entering College the
Fall of 1959 and the Fall of 1961

UNIVERSITY OF MINNESOTA
COLLEGE OF SCIENCE,
LITERATURE, AND THE ARTS
SEX: MALE

Predictions Based on HSR

High School Rank Quintile Group	Chance in 100 of a freshman obtaining an average grade of:		
	D or Higher	C or Higher	B or Higher
80-	95	65	21
60-79	88	41	6
40-59	85	29	3
20-39	75	24	2
-19	61	16	-

Predictions Based on MSAT

MSAT Quintile Group	Chances in 100 of a freshman obtaining an average grade of:		
	D or Higher	C or Higher	B or Higher
Raw Score 51-78 Percentile 80-	95	62	21
Raw Score 45-50 Percentile 60-79	91	44	8
Raw Score 34-41 Percentile 40-59	85	34	5
Raw Score 27-33 Percentile 20-39	87	35	5
Raw Score 1-26 Percentile -19	90	39	-

These Correlations are based on freshmen MALES who entered the University of Minnesota in the Fall of 1961. They graduated from Minnesota High schools in 1959, 1960, and 1961.

Correlations Between First-Year Grade-Point Average and Junior Tests and High School Rank for Colleges of the University of Minnesota - Men

	<u>N.</u>	<u>Zero Order Correlations</u>			<u>Multiple Correlations</u>	
		<u>HSR</u>	<u>MSAT</u>	<u>Coop. Eng. TEST</u>	<u>HSR & MSAT</u>	<u>HSR, MSAT & CET</u>
Ag,F,H Ec	253	.623	.369	.355	.634	.635
Educ.	40	.414	.482	.382	.516	.519
GC	742	.305	.246	.295	.392	.414
IT	666	.546	.387	.362	.578	.579
SLA	1375	.392	.299	.270	.445	.445

MINNESOTA COLLEGE ADMISSION FORM

Sponsored by the Association of Minnesota Colleges

Page 1
(for applicant)

DIRECTIONS (Please use pen or typewriter):

This is an important application. Complete pages 1 and 2 carefully and accurately, and return this form to your high school. Your school will forward it to the appropriate college.

This application is for _____

NAME OF INSTITUTION (IF UNIVERSITY OF MINNESOTA, NAME COLLEGE ALSO)

CITY

1. Name in full: _____
LAST FIRST MIDDLE

2. Permanent Address: _____
STREET CITY STATE ZIP CODE COUNTY

3. Sex: Female () Male () Telephone No. _____ Age in years: _____

4. Date of birth: _____ Place of birth: _____
MONTH DAY YEAR CITY STATE

5. State in which your residence is located: _____ How long have you lived there? _____

6. Married? Yes () No (); if yes, number of children: _____ 7. Number of brothers: _____; sisters: _____

8. Name of parent or guardian: _____ Occupation: _____

9. Address of parent or guardian: _____
STREET CITY STATE ZIP CODE

10. Father's education (circle last year attended) _____
Grade School High School College Last Degree
0 1 2 3 4 5 6 7 8 1 2 3 4; Grad? () () YES NO 1 2 3 4 5 6 7 8

11. Mother's education (circle last year attended) _____
Grade School High School College Last Degree
0 1 2 3 4 5 6 7 8 1 2 3 4; Grad? () () YES NO 1 2 3 4 5 6 7 8

12. When do you plan to enter college? _____
TERM YEAR

13. What course of study, major, or curriculum do you plan to follow, e.g., English, history, pre-law, electrical engineering? (The bulletin of the college is helpful in making this decision. Use the name given in the bulletin, and try to be specific, if possible.) If you have made no decision write "undecided," but indicate any alternatives you are considering.

14. List your vocational preferences, in order of choice (be as specific as you can e.g., "high school teacher," "civil engineer," "dentist," "nurse," "research physicist," etc.). If you have made no decision write "undecided," but indicate any alternatives you are considering.

(1) _____ (2) _____

(3) _____

15. How will you finance your first year in college? Indicate approximate percentage from each source.

FAMILY % WORK IN COLLEGE % PERSONAL SAVINGS % LOAN % SCHOLARSHIP % VETERAN'S AID %

16. Have you had military service in the armed forces of the United States? _____ When? _____

For how long? _____ Branch and Specialty? _____

17. Are you now a member of the National Guard? Yes () No () Organized Reserve? Yes () No ()

18. Have you ever attended any college? Yes () No () If yes, please contact each college and request that a transcript be sent directly to the college or university for which you are applying.

19. Educational record:

Names of all schools and colleges attended since completion of elementary school (List most recent one first)	STATE	TOWN OR CITY	YEAR	DEGREE OR DIPLOMA RECEIVED

20. In what one field of study or subject area have you done your best work? _____

21. In what one field of study or subject area have you done least well? _____

22. (a) List the school and community activities and organizations in which you have held an office. Identify the nature of the organization if the name is not self-explanatory.

First Year	Second Year	Third Year	Fourth Year

(b) List activities and organizations in which you were active but did not hold office.

23. What are your strongest interests or hobbies?

(a) _____ (b) _____ (c) _____

24. Enumerate your outstanding achievements and your abilities or talents in particular fields such as athletics, music, dramatics, science, etc. (e.g., award in scientific talent search, state music or speech contests, literary award in creative writing).

25. List your employment record indicating most recent employment first.

Employer or organization	Nature of work	Dates of employment From To	Location

SIGNATURE OF APPLICANT _____

DATE THIS PAGE COMPLETED _____

Directions for the school: Please complete the following student evaluation and test information in the spaces provided. Forward this application to the college of the student's choice. A properly certified legible machine copy of the school record may be submitted in lieu of pages 3 and 4. Even if such copies are used, you are encouraged to complete the Student Evaluation Section below.

STUDENT EVALUATION

Please indicate any information which might assist in interpreting the student's record (for example, evidence concerning the student's judgment, maturity, cooperation and reliability). The scale below the section for comments may supplement your evaluation.

	SIGNATURE				POSITION	
COOPERATION Consider willingness to work with people in various capacities, loyalty.	_____ Outstanding	_____ Usually willing	_____ When convenient	_____ Indifferent	_____ Unwilling	
EMOTIONS Consider way he reacts in various situations when stress is likely.	_____ Unusual balance	_____ Well balanced	_____ Fairly well balanced	_____ Easily depressed or elated	_____ Unresponsive	
INITIATIVE, INDUSTRY Consider ability to see things to do, resourcefulness, aggressiveness.	_____ Seeks additional tasks	_____ Does supplemental assignments	_____ Does ordinary assignments	_____ Needs occasional prodding	_____ Needs constant prodding	
JUDGMENT AND COMMON SENSE Consider ability and foresight in decisions in everyday situations.	_____ Sound decisions	_____ Good conclusions	_____ Fair deductions	_____ Poor results	_____ Lacks ability	
LEADERSHIP Does he get others to do what he wishes.	_____ Consistently is a leader	_____ Usually is a leader	_____ Leads occasionally	_____ Seldom leads his fellows	_____ Never leads his fellows	
PERSONALITY Consider mannerisms and appearance; general impression on others.	_____ Sought out	_____ Well liked	_____ Accepted	_____ Tolerated	_____ Rejected by others	
RELIABILITY Consider dependability, willingness, honesty.	_____ Exceptionally reliable	_____ Very reliable	_____ Usually reliable	_____ Erratic	_____ Unreliable	

The scale completed above is: a composite evaluation (); an evaluation by one person ()

SIGNATURE

POSITION

TEST DATA

Ability, aptitude, reading and achievement tests are of particular interest. More detailed profiles and reports may be enclosed on a separate sheet.

[illegible]

Directions: Please complete the student's school record information below. A properly certified legible machine copy of the school record may be submitted in lieu of Page 4. Supplemental information is invited (e.g., school profiles and descriptions of special programs).

THE COLLEGE THAT THE STUDENT SEES TO ENTER

Name of applicant _____
(PRINT ALL NAMES IN FULL) FIRST MIDDLE LAST

Address _____ City _____ State _____

Date of birth _____ Place of birth _____
CITY STATE

Name of parent or guardian _____ Address _____

The applicant () is a graduate, () will graduate, from _____
NAME OF SCHOOL

located in _____, state of _____
CITY STATE

Date of graduation _____ Date of application _____

I certify that the applicant has pursued the subjects listed below and received the grades recorded.

OUT OF STATE SCHOOL: NAME ALL AGENCIES, ORGANIZATIONS, OR INSTITUTIONS BY WHICH ACCREDITED

SIGNATURE OF CERTIFYING OFFICIAL

Complete the grade record listing English, Social Studies, Mathematics, Natural Science, and Language courses on the lines provided for them. Write in all course titles (clear abbreviations such as Geom., Am. Hist., etc. are acceptable). Star (*) all advanced, enriched, or accelerated courses (enclose any additional course information which will be helpful in understanding your curriculum).

Area	(9) (title)	Grade	units	(10) (title)	Grade	units	(11) (title)	Grade	units	(12) (title)	Grade
Engl.				E			E			E	
Soc. St.				SS			SS			SS	
Math.				M			M			M	
Nat. S.				NS			NS			NS	
Lang.				L			L			L	
Other											
Other											
Other											

Applicant ranks _____ in graduating class of _____
FROM TOP NUMBER

Rank based on: through jr. yr. _____; through 1/2 sr. yr. _____; through sr. yr. _____

In computing rank are all grades included and of equal weight? Yes _____ No _____

Comments on ranking or grading procedures _____
(ENCLOSE ADDITIONAL STATEMENT IF NECESSARY)

Marking system if other than A,B,C,D,F

A = _____

B = _____

C = _____

D = _____

F = _____

UNIVERSITY OF MINNESOTA

College of Agriculture, Forestry, and Home Economics_____

College of Science, Literature, and the Arts_____

General College_____

PERSONAL INVENTORY FOR ENTERING STUDENTS

For all students entering or returning to this college

Your careful completion of this Personal Inventory will help your faculty counselor to be of greater assistance to you. Outlining your objectives, planning your program, and distributing your time among the many opportunities of the University are among your most important responsibilities. This Personal Inventory will help your counselor to become better acquainted with you and consequently to be more helpful.

Today's date_____

A. General Identifying Information

Date of Birth_____

Name_____

(Please print) Last First Middle

Male_____ Female_____ Veteran_____ Nonveteran_____ G.I. Bill_____ Veteran Rehabilitation_____ State Rehabilitation_____

Local Address_____ Phone_____

Permanent Address_____ Phone_____

Parent or Guardian:

Name_____

Address_____ Phone_____

If you have any physical handicaps, please note them here_____

B. Educational Experience and Plans

Students who come to college normally have a twofold objective—to round out their general education and to prepare for a vocation. Vocational matters are treated in a later section. It is important here to examine your over-all objectives. The answers will help you greatly in building a well-rounded and interesting program for yourself.

High school and location_____ Year graduated_____

Name any colleges attended, and dates_____

Give approximate number of college credits transferred_____

Name any special schools (Art, music, business, nursing, etc.)_____

List subjects you particularly like, and why_____

List subjects you particularly dislike, and why_____

Aside from specific job training, in what ways do you think your education is still weak? That is, what do you want to be able to do which you cannot do now? (For example: appreciate the fine arts, understand world affairs, write and speak effectively, develop a personal philosophy, etc.)

How long do you expect to attend the University? _____ From what college do you expect to get a degree? _____

Did you originally plan to enter this college? Yes _____ No _____ If not, in what college had you expected to enroll? _____

It is not always necessary to decide upon a major upon entrance, and indeed it is often wise to postpone that decision until after further university experience. If you have made a tentative decision, however, what is it? _____

How certain are you of it?

Absolutely
fixed choice

Reasonably
certain

Fairly
certain

Somewhat
doubtful

Very
uncertain

If you are undecided, what possibilities are you considering? _____

Have you studied your college bulletin, in order to understand better the purpose and programs of your college? _____

C. Occupational Experience and Plans

Many entering students think of college largely in terms of vocational preparation. Of course vocational training is a legitimate objective in college, but one who limits himself to this sort of thinking will miss many important opportunities which the University offers (including the best preparation for vocations). This section is devoted to your vocational plans.

The world of work can be classified generally in terms of the seven categories of interests and abilities listed below. Disregarding any limitations of ability or finances which you may feel, which do you think you would prefer to do? Number your first choice 1, your second choice 2, your third choice 3, and so on for all seven.

_____ Occupations involving business contacts with people, such as the various fields of selling, promotional work, politics, etc.

_____ Occupations involving business detail, such as accountant, business statistician, cashier, banker, stenographer, and office clerical worker.

_____ Occupations involving social service activities, such as youth organization workers (Y.W.C.A., Boy Scout, etc.), personnel worker, social case worker, minister, teacher (including Agriculture and Home Economics), welfare worker, counselor, etc.

_____ Occupations requiring special artistic abilities, such as musician, actor, artist, interior decorator, designer, etc.

_____ Occupations involving technical or scientific work, such as plant scientist, engineer, chemist, surgeon, veterinarian, mathematician, research worker, inventor, physicist, toolmaker, county agricultural agent, forester, etc.

_____ Occupations involving verbal or linguistic work, such as lawyer, newspaper man, author, advertising man, professor, librarian, rural journalist, etc.

_____ Occupations involving executive responsibilities, such as director, office manager, foreman, president of a manufacturing concern, public administrator, etc.

Now go back and renumber the above categories, using Roman numerals I through VII, to show the fields in which you think you would be most successful, taking into account your abilities, interests, and all other factors.

If you have a vocational objective, what is it? Be as specific as possible, indicating kind of business, size of company, etc.

When did you make this choice? _____

How certain are you of this choice? _____

Absolutely
fixed choice

Reasonably
certain

Fairly
certain

Somewhat
doubtful

Very
uncertain

If you are undecided, what alternatives are you considering? _____

What would you like to be doing 10 or 15 years from now? _____

Have you ever talked about vocational plans with a counselor in a Veterans Administration Advisement Center, the University Student Counseling Bureau, your high school, or with a professional person in your community or elsewhere? _____

When and where? _____

Summarize briefly the vocational conclusions of your discussions with these persons.

Summarize briefly your work experience, including military assignments if any. Indicate:

[illegible]

Are there any questions you would like to ask about your vocational choice? Yes_____ No_____

D. Student Activities, Community Participation, and Leisure-time Interests

Some of the greatest values of a college education come from experiences outside of class. Group activities, job responsibilities, and leisure-time interests can help greatly to develop powers of leadership and habits of responsibility. These interests always have important relation to course work, and the information in the following sections will help in planning your total program realistically.

In what activities did you participate in high school or in the community while in high school? (Journalism, church, Scouts, student government, etc.) Note any offices you held or special responsibilities you carried.

If any time has elapsed between high school and now, summarize similar activities for that period.

What are your plans for participation in college activities? _____

What are your chief hobbies or leisure-time interests? _____

Would you like to discuss any of these matters with your counselor or adviser? Yes _____ No _____

E. Family and Living Arrangements

Father's education (Indicate highest year completed) _____

Mother's education (Indicate highest year completed) _____

What is (or was) your father's occupation? (List title of position and nature of work, and the agency, firm, or institution where he is employed) _____

Mother's present occupation _____ Mother's occupation before marriage _____

Please describe your general family situation (For example: parents living together, either dead, parents divorced, step-parents, etc.) _____

Please fill in the necessary information about your brothers and sisters in order of age.

Age	Sex (M or F)	Education (Highest Grade Reached)	Married (Yes or No)	Occupation (If Unemployed Give Usual Occupation or Training)
-----	-----------------	---	---------------------------	---

Your marital status _____ Number of children _____

What will be your living arrangements while in the University? (at home with family, rooming house, dormitory, University Village, etc.) _____

Do you consider these living arrangements satisfactory? _____

Would you like to discuss any of these matters with your counselor or adviser? Yes _____ No _____

F. Financial Plans

What are your financial plans for attending the University? For example: family gives complete support, G.I. Bill, must work for spending money, wife working, loan to be repaid after college, savings, etc.) _____

Will you be working this next quarter? _____ About how many hours per week? _____

How much must you make per week? _____ Do you have a job yet? _____

Describe the job—where? doing what? hours? _____

Would you like to discuss any of these matters with your counselor or adviser? Yes _____ No _____